COMBAT AIRCRAFT 119

Mark Chambers
with Tony Holmes

NAKAJIMA B5N 'KATE' AND B6N 'JILL' UNITS

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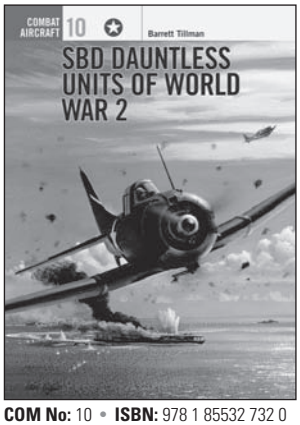

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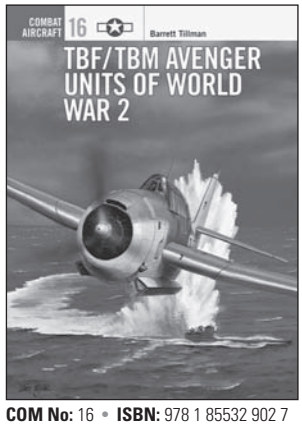

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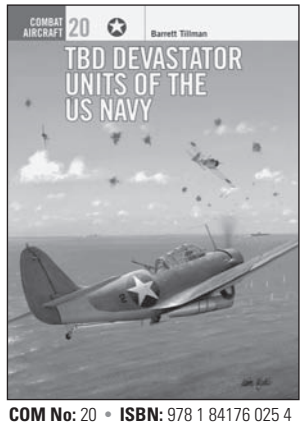

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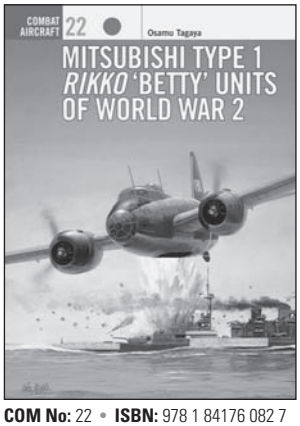

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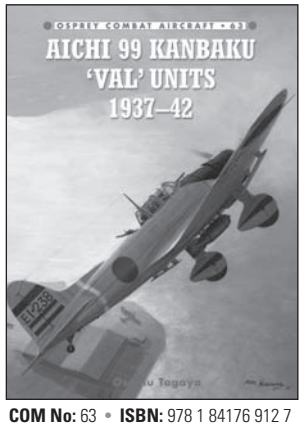

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SERIES EDITOR TONY HOLMES

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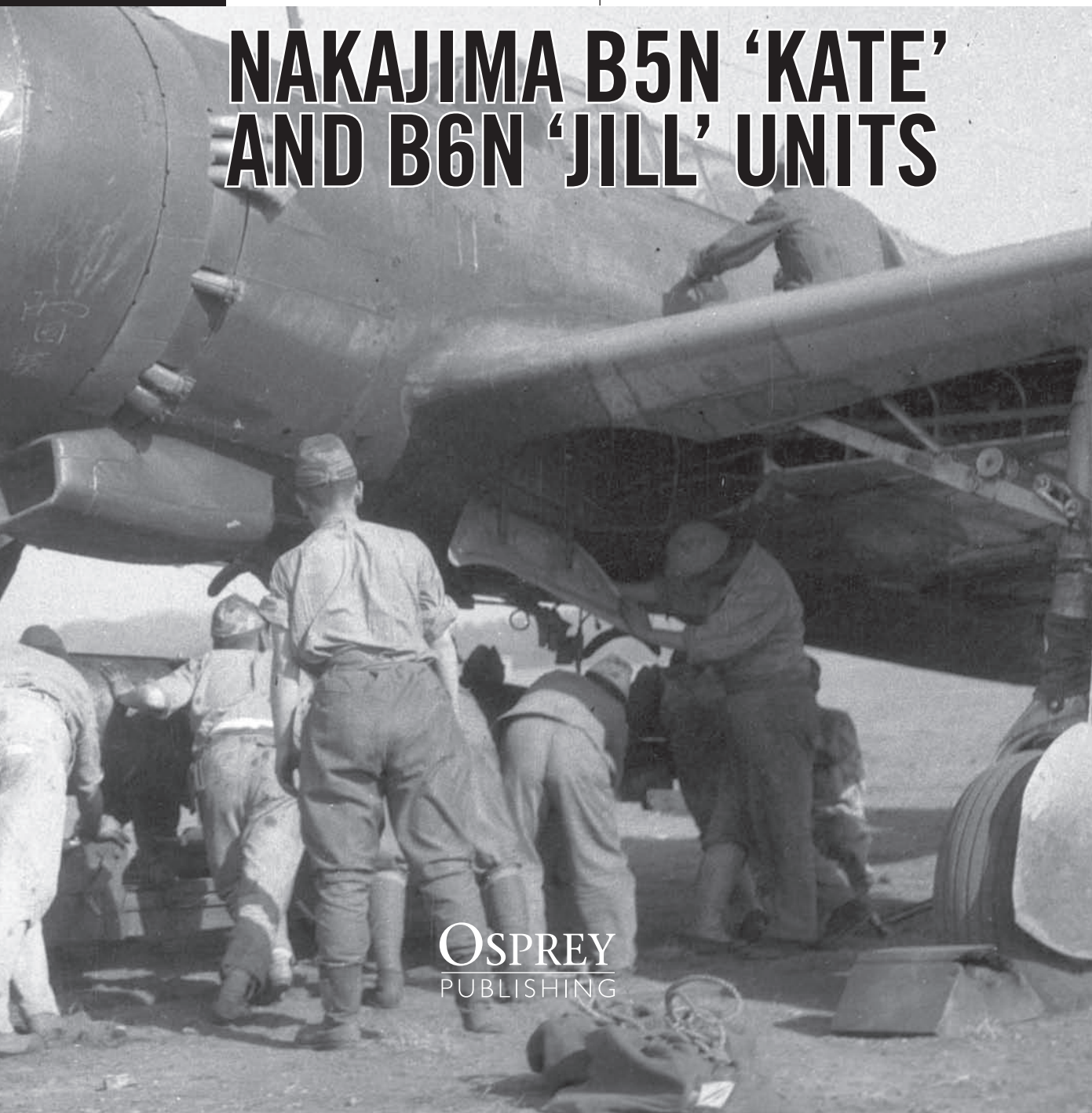

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Front Cover
At 1028 hrs on 26 October 1942, during the Battle of the Santa Cruz Islands, a formation of 16 Nakajima B5N2 'Kate' torpedo-bombers from the Imperial Japanese Navy fleet carrier *Zuikaku* commenced torpedo runs on the US Navy fleet carrier USS *Enterprise* (CV-6). Although the 'Kates' had split up before starting their attacks, F4F Wildcats from *Enterprise* managed to down three of the torpedo-bombers and severely damaged a fourth, causing it to dive into the forecastle of the destroyer USS *Smith* (DD-378). The ship was set ablaze and 57 sailors were killed as a result, many of them perishing when a delayed detonation from the aircraft's Type 91 torpedo resulted in additional damage being inflicted on the destroyer. Thanks to effective firefighting and damage control *Smith*, nevertheless, survived. Indeed, the ship's gunners were credited with downing six of the torpedo-bombers that attacked the US Navy task force.

The remaining 'Kates' launched attacks against *Enterprise*, the battleship USS *South Dakota* (BB-57) and the cruiser USS *Portland* (CA-33). However, no torpedo hits were registered. A total of nine out of the original 16 aircraft were lost during this attack.

That same day, two 'Kates' from the IJN fleet carrier *Shokaku* and one from the IJN fleet carrier *Junyo* scored torpedo hits on USS *Hornet* (CV-8), leaving it immobilised and listless in the water. *Hornet* was subsequently abandoned and sunk by torpedoes launched from two Japanese destroyers on 27 October 1942 (*Cover artwork by Mark Postlethwaite*)

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INTRODUCTION

During the Sino-Japanese War of the late 1930s the Imperial Japanese Naval Air Force (IJNAF) introduced into service a revolutionary new torpedo/attack aeroplane, the Nakajima B5N1. It was eventually given the codename 'Kate' by the Allies, who gave all Japanese bombers female names and all Japanese fighters male names. Although the aircraft excelled in the combat arena, Japanese naval planners eventually became aware of several shortcomings in its design – particularly the inadequate armour protection for the crew and the lack of self-sealing fuel tanks. It duly authorised Nakajima to pursue the design and development of a more advanced replacement.

The IJNAF instructed Nakajima to replace the aeroplane's original Nakajima Hikari 3 radial engine, rated at 770 hp, with a more advanced Nakajima NK 1B Sakae 11 unit that produced 1000 hp. It was now hoped that the torpedo/attack aircraft would be fast enough to outpace Allied fighters. The new version of the 'Kate', designated B5N2, achieved surprising and dramatic successes in the IJNAF's attack on the US naval base at Pearl Harbor on 7 December 1941, and subsequently contributed to the sinking of the aircraft carriers USS *Lexington* (CV-2) at the Battle of the Coral Sea in May 1942, USS *Yorktown* (CV-5) at the Battle of Midway the following month and USS *Hornet* (CV-8) at the Battle of the Santa Cruz Islands in late October 1942.

Later-war-period versions of the 'Kate' were equipped with air-to-surface vessel radar and performed antisubmarine warfare (ASW) duty, while others continued to serve as bombers and trainers. Ultimately, the IJNAF's remaining 'Kates' were expended in the kamikaze role in a last-ditch measure to defend Japan's dwindling territorial possessions from Allied conquest.

The 'Kate's' replacement, the Nakajima B6N Tenzan ('Heavenly Mountain'), codenamed 'Jill' by the Allies, was a marked improvement over its predecessor. However, by the time it was deployed in combat in late 1943, the US Navy was already fielding the Grumman F6F Hellcat in large numbers aboard its carriers, and the fighter soon gained aerial supremacy in Pacific skies. The 'Jill' was never really able to achieve its full potential in combat and, like most other IJNAF aeroplanes, was relegated to the kamikaze role during 1945.

This book covers the history of the 'Kate' and 'Jill' torpedo/attack bombers, including their design and development, as well as the aeroplanes' action-packed combat record.

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The Yokosuka B4Y1 (Navy Type 96 Carrier Attack Aircraft), codenamed 'Jean' by the Allies, was the IJNAF's last biplane attack aircraft and precursor to the more advanced, and famous, Nakajima B5N 'Kate' monoplane attack aircraft. Marked with a 'K' code on its tail, denoting its assignment to the carrier *Kaga*, this B4Y1 is armed with four 60 kg bombs and may have been photographed during a mission over China in 1937-38. *Kaga*'s 32 B4Y1s saw considerable combat in the Sino-Japanese War between October 1937 and December 1938 (*PD-Japan-old photo*)

CHAPTER ONE

B5N 'KATE' DEVELOPMENT AND EARLY SUCCESSES

In 1934 the Naval Air Arsenal at Yokosuka devised the IJNAF's last biplane bomber in response to the Service's 9Shi requirement, which called for the development of a more advanced carrier attack aircraft. Known as the Yokosuka B4Y1 (Navy Type 96 Carrier Attack Aircraft), it was codenamed 'Jean' by the Allies following Japan's entry into World War 2. The aircraft's designer was Sanae Kawasaki of the First Naval Air Technical Arsenal, located at Yokosuka, and it was intended to offer a performance capability matching that of the Mitsubishi A5M 'Claude' monoplane fighter. The 'Jean' had a fixed undercarriage and an all-metal airframe, and was the first IJNAF carrier strike aircraft to have an air-cooled radial engine. It was operated by a crew of three, with the pilot seated in the front cockpit, a navigator in the middle and a radio operator/gunner in the rear cockpit. The 'Jean' prototype made its maiden flight in late 1935.

The first of 205 B4Y1s to see service with the IJNAF reached the frontline in early 1937. On 12 December that same year, during the *Panay* Incident, three examples gave the aeroplane its combat debut when they dropped 18 60 kg bombs on the USS *Panay* (PR-5), a US Navy gunboat

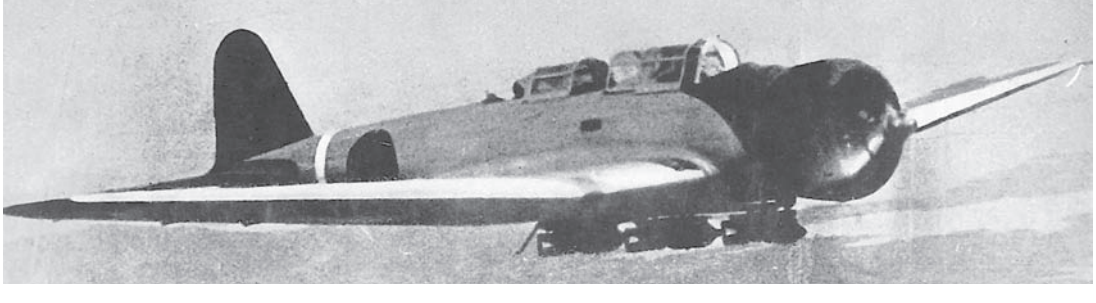
at anchor in the Yangtze River. Two bombs hit the target, which then sunk. B4Y1 carrier-based units subsequently flew combat missions in the Second Sino-Japanese War from the aircraft carriers *Akagi*, *Hosho*, *Kaga*, *Ryujo* and *Soryu*. Land-based 'Jeans' were also operational with the 13th and 15th Kokutai (Air Groups). Finally, B4Y1s were flown from the carrier *Hosho* during the Battle of Midway in June 1942, surveying damage sustained by *Hiryu.*

From 1938 the B4Y1 'Jean' was replaced by the technologically more advanced Nakajima B5N 'Kate', which would prove to be one of World War 2's finest carrier strike aircraft.

Five years earlier, in 1935, the IJN had issued the 10Shi specification requirement calling for a single-engined carrier attack aircraft of monoplane design to replace the obsolescent B4Y1. Aircraft designer Katsuji Nakamura and his team at the Nakajima Aircraft Company produced a revolutionary all-metal aeroplane that not only boasted a low-wing monoplane configuration but also a hydraulically operated retractable undercarriage. Known as the Type K, the prototype made its first flight in January 1937. Powered by a Nakajima Hikari nine-cylinder radial engine, the aircraft subsequently outperformed its rival, the Mitsubishi B5M1 (which featured a spatted, fixed undercarriage not dissimilar to that fitted to the 'Val' dive-bomber), in flight trials to determine which was the more suitable aeroplane. Although Nakajima secured a significant production order for its new aeroplane, referred to as the 10Shi Carrier Attack Aircraft, as well as the Type 97 Carrier Attack Aircraft and, finally, the B5N1, the IJN also instructed Mitsubishi to build a small number of B5M1s as a backup – 125 were delivered in total. Some B5M1s actually saw service, and limited combat, with shore-based frontline units in Southeast Asia.

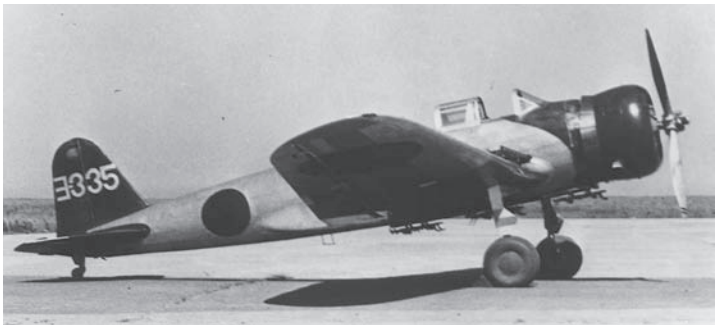
Although the B5N1 had acquitted itself well in China from late 1938, when the aeroplane had entered service it was powered by the interim 770 hp Nakajima Hikari 3 radial due to the preferred 1000 hp Nakajima NK 1B Sakae Model 11 14-cylinder two-row radial still awaiting officially acceptance by the IJNAF. Once the latter powerplant was approved for frontline use, Nakajima set about modifying the B5N1 to make it compatible with the new engine. The airframe's aerodynamics were also improved, thus making it some six miles per hour faster. Known as the B5N2, the new model supplanted the B5N1 in both production and combat duties from 1939 onwards.

During the latter stages of World War 2, surviving B5N2s were used in training, target towing and ASW roles. For the ASW mission, late-war 'Kates' were equipped with radars and magnetic anomaly detector



Armed with six 60 kg Type 2 No 6 Model 5 bombs beneath its centreline, this B5N1 is seen heading for its target during the Sino-Japanese War. A relatively small number of Navy Type 97 Carrier Attack Aircraft fought in China from 1938 through to the start of the Pacific War, flying from the carrier *Akagi* as well as from land bases with 12th and 14th Kokutai (*US National Archives at College Park, MD, Still Pictures Branch*)

(MAD) systems. A total of 1149 'Kates' were produced on three production lines (by Nakajima, Aichi and Dai-Juichi Kaigun Kokusho) between 1936 and 1943.



EARLY COMBAT SUCCESSES

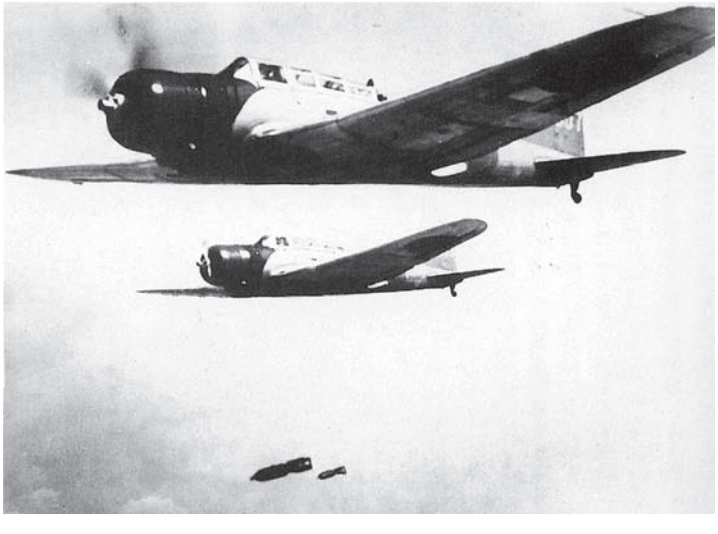
On 30 September 1938 IJNAF carrier aircraft, including B5N1 'Kates', bombed coastal defences near the Pearl River Delta within the Guangdong Province of China. Twelve days later IJNAF aircraft, some of them land-based with 12th and 14th Kokutai, flew support missions for the Imperial Japanese Army's 5th, 18th and 104th Divisions, which successfully landed at Daya Bay, near Guangzhou in Guangdong Province. On 21 October IJNAF carrier aircraft participated in the bombing of the city of Guangzhou. In his memoirs *For that One Day – The Memoirs of Mitsuo Fuchida, Commander of the Attack on Pearl Harbor* (translated by Douglas T Shinsato and Tadanori Urabe, eXperience inc., Kamuela, Hawaii, 2011), Mitsuo Fuchida described the role he played in the Japanese aerial assault on China during the Guangdong operation while flying in his B5N1 'Kate'.

'Upon graduating from the Naval Staff College I was assigned as the aviation leader of the *Ryujo*, a medium-sized aircraft carrier. I joined the special Guangdong Attack Operation. In the dive-bombing team under my command, experienced and superior pilots like Lts Takashige Egusa and Mamoru Seki gave me the confidence to fly over the battlefield leading the "warhorses". However, the Guangdong attack operation was easily and successfully completed before I had a chance to flex my muscles as a leader.'

For the remainder of the Sino-Japanese conflict B5N1s assigned to the IJN aircraft carrier *Akagi*, as well as those flying with 12th and 14th Kokutai, flew level-bombing missions in the close-air-support (CAS) role for Japanese Army ground forces in China from early 1940 through to the start of the Pacific War in December of the following year.

During 1941 relations between the USA and Japan deteriorated and war became inevitable. Japanese military leaders planned to strike a crippling blow to the US Navy and US Army Air Corps (USAAC) fleets forward deployed in the Pacific in a series of unprecedented surprise attacks on the naval base at Pearl Harbor and USAAC installations throughout the island of Oahu, in Hawaii. By the time Japan was ready to wage war on the USA, the B5N2

These early-build B5N2s were possibly assigned to 12th Kokutai, which was one of two land-based IJNAF Kokutai involved in the Sino-Japanese War. Flying from Hankow, in central China, the unit operated its 'Kates' alongside 'Val' dive-bombers from the spring of 1940. Although these aircraft are seen here 'dropping' bombs, neither B5N2 is fitted with external racks, so the ordnance in this photograph has probably been faked for propaganda purposes (*Kingendai/AFLO, JMQA006800*)



LEFT This aeroplane from the Yokosuka Kokutai (the katakana symbol looking like a backward 'E' – in the B5N1's tail code translates to 'YO' for 'Yokosuka') has bomb racks fitted, but no bombs. Looking resplendent in its overall silver paint finish, the aeroplane also has a black anti-glare panel that covers the entire engine cowling, with a curved demarcation line to the front of the windscreen – this was seen on most B5Ns until the advent of dark green uppersurface camouflage. The red tail assembly was a standard marking for all IJNAF aircraft, except primary trainers, from June 1933 as a visual aid for the location of downed machines (*Phil Jarrett*)

had replaced the B5N1 as the IJN's premier carrier strike aircraft serving aboard its large fleet carriers, although some of the latter remained within the air groups embarked in smaller carriers.

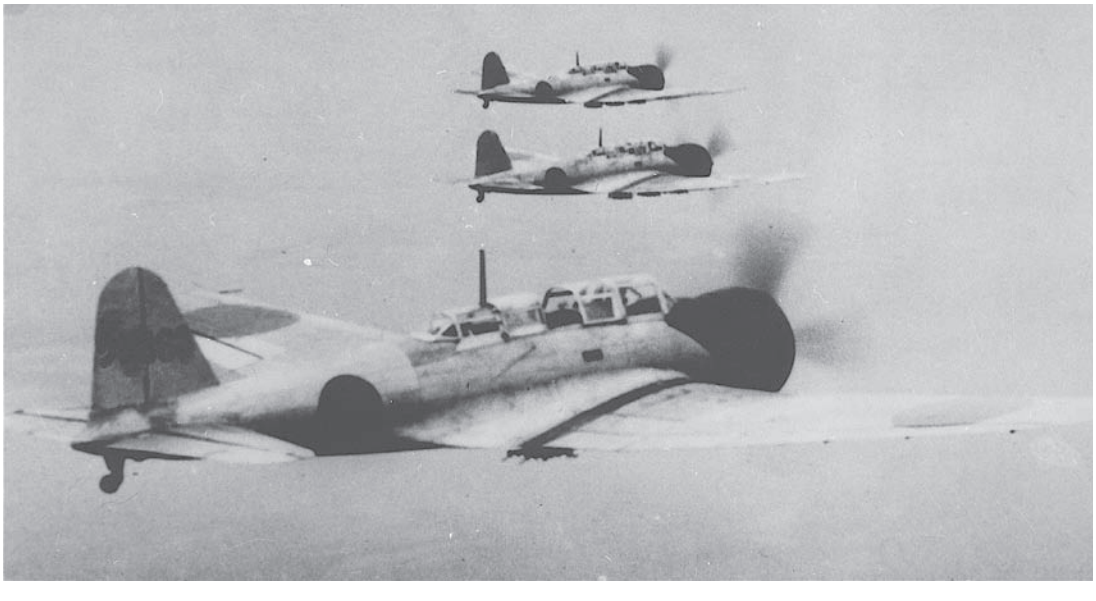
Cdr Mitsuo Fuchida was serving aboard one of these carriers, the *Akagi*, having been appointed commander of its aviation squadron (which included 27 B5N2s) in 1939 following his experiences in China. In this extract from his memoirs, he described the predominating conventional thinking among Japanese naval commanders regarding the role of carrier aviation and air power in the IJN when he joined *Akagi*, and how he set about changing this mindset;

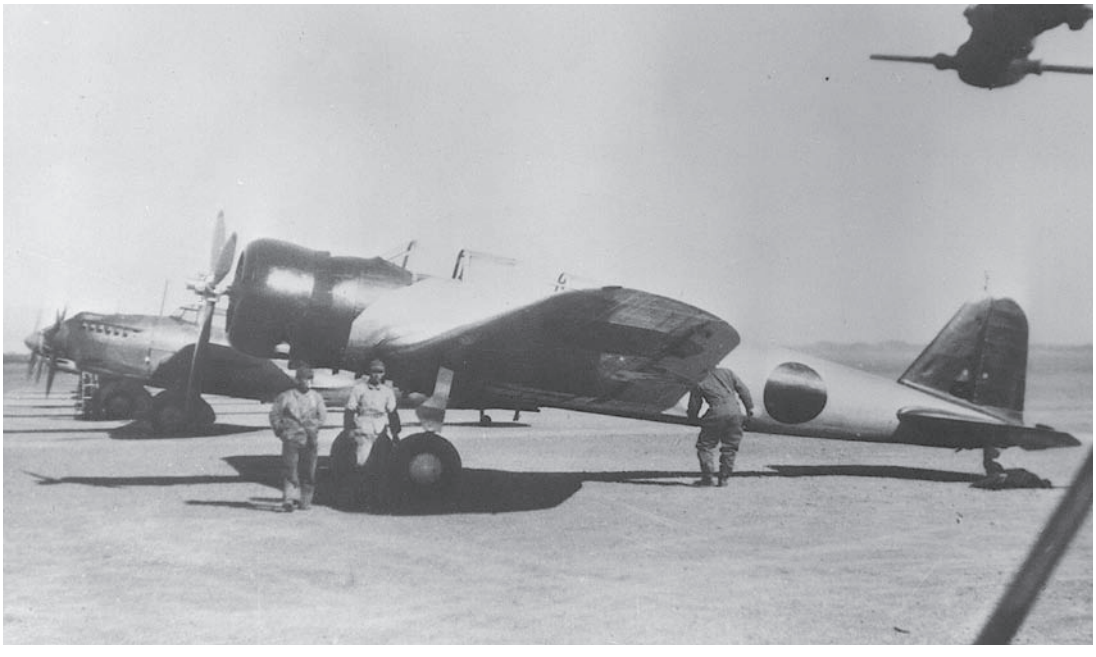
'I admit that, in those days, it was accepted wisdom in the navy that aircraft carriers were categorised as auxiliary forces. In principle, therefore, aircraft carriers were dispersed and deployed individually, and their main duty was search and reconnaissance. They might be called on to engage in an air attack, but the expectation was limited to include mainly cooperation with the submarine fleet to harass the enemy fleet. This was also the case whenever we had map exercises at the Naval Staff College.

'Under the prevailing common thinking, even if the aviation leader held the rank of naval lieutenant commander, his repeated explanations that the aircraft carrier was the main element of the fleet sounded like an overblown theory of aviation's versatility. I was determined to prove the attack capabilities of aircraft carriers – by all means – as the first step in enlightening the rest of the navy, and I led the *Akagi* aviation squadron with determination.

'The original speciality of Rear Admiral Jisaburo Ozawa, Commander of 1st Koku Sentai [Carrier Division], was torpedoes, and it appeared that aviation was new to him. But what he emphasised from his arrival was the importance of concentrated air attacks launched from aircraft carriers, as well as unified command. I was encouraged by what Ozawa had to say. "Fuchida, carrier-based air power is the key factor in sea battles. This power should be employed en masse". Since this is what

Three unpainted B5N1s from Kasumigaura Kokutai were photographed on a training mission in 1939-40. Although the bomb racks on the aeroplane closest to the camera are empty, the remaining two 'Kates' appear to be fully loaded with six 60 kg Type 2 No 6 Model 5 each (*Phil Jarrett*)





Devoid of any tail codes, this immaculate B5N1 was photographed in China in 1940 during its service with either 12th or 14th Kokutai. Parked behind it are several JAAF Kawasaki Ki-32 'Mary' light bombers (*Phil Jarrett*)

I had consistently argued, I was immensely overjoyed. Consequently, I had great esteem for this commander, one who had such a superb understanding of aviation's role.'

Fuchida also described the composition of 1st and 2nd Koku Sentai at the time, as well as their roles in practice exercises and the early problems they encountered;

'1st Koku Sentai consisted solely of the *Akagi*, and only *Soryu* remained in 2nd Koku Sentai in 1939 because of *Hiryu*'s absence due to rebuilding.

'In practice drill or training, *Akagi* and *Soryu* often assumed enemy positions against each other. I asserted that the problem of assembly over the ocean occurs because of the independent deployment of individual carriers. However, this could be solved by group deployment. Such a simple matter would not be considered in those days. The prevailing conventional wisdom was independent deployment, the objective being to make the carrier less visible and to reduce the risk of enemy attack in light of the carrier's vulnerability. What senior officers failed to understand was that the group deployment of carriers meant a larger force of fighters to protect the entire carrier group more effectively.

'I recommended this idea to Ozawa. "Commander, if *Akagi* and *Kaga* of 1st Koku Sentai and *Soryu* and *Hiryu* of 2nd Koku Sentai are organised as a single air fleet, we can carry out our practice drills for a massive assault as a carrier air force. Based on a concentrated deployment of four carriers, everybody in the navy will realise that carrier air strength can be the main player in decisive battles. Please recommend this to the authorities immediately."

'Ozawa nodded with a smile. "I will".

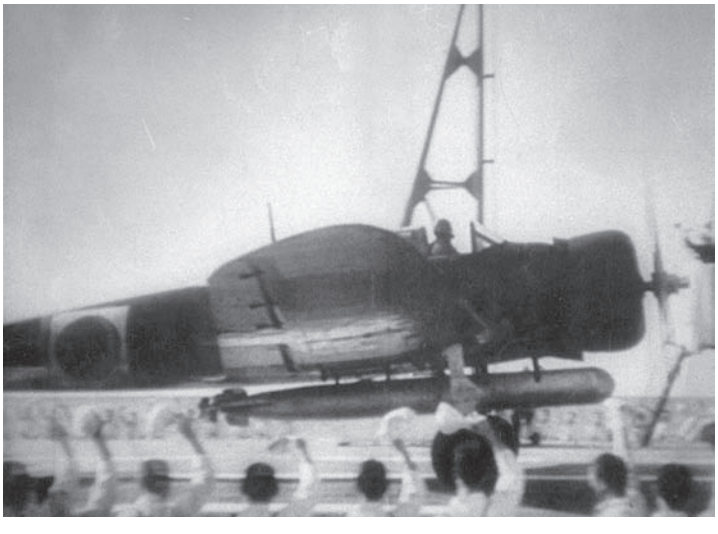
'Thus, after practice was ended in the first half of 1940, Ozawa submitted his opinion to the Minister of the Navy regarding the organisation of the air fleet.'

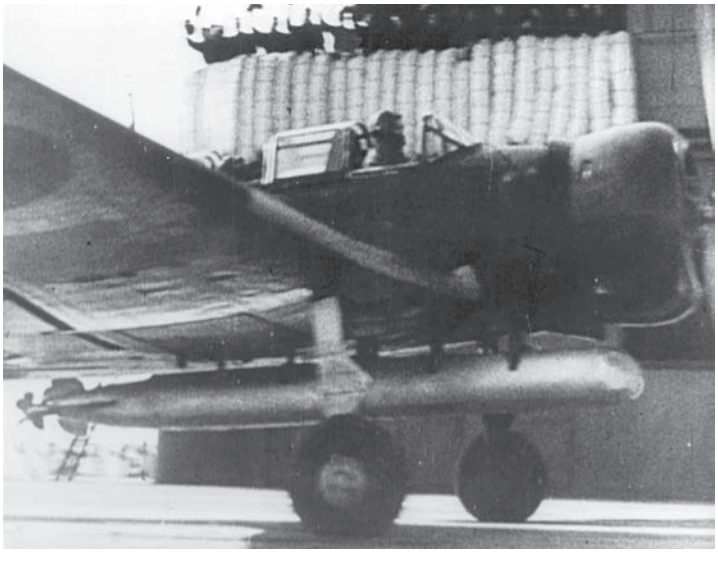
A little more than a year before the surprise attack on Pearl Harbor, IJNAF carrier-based 'Kate' units practised intensely, putting the 'massive carrier aviation air assault theory' to the test. Fuchida described some of these practice exercises as follows;

'It was early November, nearing the end of the year. The Combined Fleet engaged in various training drills en route from Ariake Bay [officially called Shibushi Bay] to Saeki Bay in the north. It was the finish of the annual training programme called *tengi* [combat training], and many *tengi* commissioners were sent from the central authority to investigate our performance.

'Our *Akagi* air squadron was going to launch actual torpedoes at night with drill heads attached, targeting four battleships of the First Squadron. The serial number of this particular drill was Operation No 112. I took off from the *Akagi*, leading 27 aeroplanes of the torpedo-bomber squadron and nine of the reconnaissance and lighting squadron, flying in search of the First Squadron. The point of a night assault is, first, detection of the enemy by the reconnaissance squadron, followed by the dropping of flares by the lighting squadron and, finally, launching of torpedoes by the torpedo-bombers. This operation will not succeed unless coordination among the three squadrons is done with perfect precision. On this night-assault drill the three parties worked in perfect harmony and assured a successful attack. While we were returning after the drill we happened to catch a radio message from Commander-in-Chief Yamamoto on board his flagship, *Nagato*, to Commander Ozawa that said "Operation No 112 was superb".

'I was satisfied, but it was not merely because our operation was praised, but because we had succeeded in enlightening the navy, even if to a limited extent, by actually proving the full capability of air power. The results of the *tengi* commissioners' performance investigation showed a hit ratio of 80 per cent for the 27 torpedoes that were launched, with all four battleships declared eliminated ships. This meant that if this had been an actual battle, the ships would have been sent to the bottom of the sea.'





B5N1s armed with dummy Type 91 aerial torpedoes commence their mock takeoff runs from a set made to look like the carrier *Akagi* during the filming of the motion picture *Hawai – Mare Oki Kaisen* (*The War at Sea from Hawaii to Malaya*) produced in 1942 (*Walter Daran/The Life Images Collection/Getty Images and US National Archives at College Park, MD, Still Pictures Branch*)

The IJNAF's carrier-based squadrons assigned to First Air Fleet (formed on 10 April 1941 and consisting of the carriers *Akagi*, *Kaga*, *Soryu* and *Hiryu* – all four ships subsequently participated in the surprise attack on Pearl Harbor) were based at a variety of airfields throughout southern Kyushu in late 1941. Most of the B5N2s that took part in the operation, both as level- and torpedo-bombers, called Kagoshima naval airfield home, with a smaller contingent based at nearby Izumi. On 26 November 1941 the IJN fleet known as the Mobile Force (Kido Butai), consisting of six aircraft carriers (*Akagi*, *Kaga*, *Soryu*, *Hiryu*, *Shokaku* and *Zuikaku*), left the waters of northern Japan and steamed towards the Hawaiian Islands. As Fuchida recounted;

'The number of carrier-based aeroplanes of First Air Fleet was 60 each for *Akagi* and *Kaga*, 50 each for *Soryu* and *Hiryu* and 70 each for *Zuikaku* and *Shokaku*, making a total of 360 aeroplanes. However, because of the constraints of the carriers' flightdecks, it was not possible to despatch all the aeroplanes at the same time, so they took off in two stages. As a consequence, the air squadron of 360 aeroplanes was separated into two attack waves, the first wave with 189 aeroplanes and the second wave with 171 [the attack force that targeted Pearl Harbor, after aborts, actually numbered 350 aeroplanes – 183 in the first wave and 167 in the second].

'Accordingly, takeoff time was fixed at 30 minutes before sunrise – sunrise in Hawaii in early December is about 0630 hrs (local time), which meant takeoff would be at 0600 hrs. This time corresponded to 0130 hrs in Tokyo. According to the plan, after the first wave took off, the second wave would take off 45 minutes later. The takeoff position was 230 miles to the north of Oahu Island, and the flying speed would be 200 to 250 knots [the B5N2's top speed was a modest 204 knots]. It will take almost two hours, more or less, to reach our destination – Pearl Harbor.

'Our operational objective was to annihilate the US Pacific Fleet. The main targets for our attack would be its aircraft carriers and battleships. At that time the main force of the US Pacific Fleet, which was assumed to be in the Hawaii area, was its four carriers – *Lexington*, *Yorktown*, *Hornet* and *Enterprise*. According to our intelligence reports, *Saratoga* was under repair in the San Diego Naval Yard, and it would take at least a month for the ship to appear in Hawaii. As for the battleships, our information said it was certain that eight ships – namely *West Virginia*, *Maryland*, *California*, *Tennessee*, *Arizona*, *Pennsylvania*, *Nevada* and *Oklahoma* – were present in the Hawaii area.

'Therefore, our main targets were four aircraft carriers and eight battleships. The cruisers, destroyers, submarines and other auxiliary ships like oilers and repair ships were secondary targets. The aircraft which would concentrate their attack on these main targets were the 49 aeroplanes of the level-bombing squadron (the main force of the attack squadron under my command), 40 torpedo-bombers led by Lt Cdr Shigeharu Murata and 78 dive-bombers led by Lt Cdr Takashige Egusa during the second wave of the attack.

'As far as enemy airfields in Hawaii were concerned, we knew of the existence of six such bases – three Navy air bases located at Ford Island, Kaneohe and Barbers Point, and three Army air bases located at Hickam, Wheeler and Bellows.'

Cdr Mitsuo Fuchida of the IJNAF was accepted into the IJN Academy at Etajima, Hiroshima, in 1921, where he developed a strong interest in aviation. He graduated on 24 July 1924 and by December 1930 he had risen to the rank of lieutenant. Fuchida eventually became an expert on horizontal bombing. Initially assigned to the IJN fleet carrier *Kaga* in 1929, he then served with the Sasebo Air Group, amongst other posts, attaining the rank of lieutenant commander on 1 December 1936. After serving at the Naval Staff College, Fuchida commanded *Akagi*'s aviation squadron in 1939-40. Promoted to the rank of commander in October 1941, Fuchida led the first-wave B5N2 'Kate' level-bombers during the surprise attack on Pearl Harbor on 7 December 1941 (*PD-Japan-oldphoto*)

OPPOSITE
A B5N2 takes off from *Shokaku* on 7 December 1941. Eighteen 'Kates', led by Lt Tatsuo Ichihara (and escorted by nine Zero-sens from *Soryu*), took off from 0715 hrs as part of the second attack wave that targeted NAS Kaneohe from 0855 hrs. Each B5N2 was armed with a combination of 60 kg Type 2 No 6 Model 5 and 250 kg Type 1 Model 25 Mark 2 bombs. The 'Kates' – and strafing Zero-sens from three carriers – inflicted considerable damage on the airfield, destroying 33 PBYs and one OS2U Kingfisher (*US National Archives at College Park, MD, Still Pictures Branch*)

Lt Cdr Shigekazu Shimazaki commanded the second wave of B5N2 level-bombers that destroyed most of America's land-based air power at Hickam Field and on Ford Island during the attack on Pearl Harbor. He had commenced his flight training in 1932 and subsequently became a torpedo-bomber instructor two years later. After briefly serving as a section commander aboard the carrier *Kaga*, Shimazaki was assigned to the IJNAF airfield at Shanghai in 1937. There, he participated in bombing missions against China. Promoted to lieutenant commander in 1940 whilst serving aboard the carrier *Akagi*, Shimazaki became the commander of *Zuikaku*'s aviation squadron in September 1941, and achieved glory in Japan for his exploits during the Pearl Harbor raid. After contributing to the sinking of the fleet carrier *Lexington* during the Battle of the Coral Sea in May 1942, Shimazaki became commander of the Kure Naval District. He ultimately perished in aerial combat off Taiwan in January 1945. He was later promoted posthumously to the rank of rear admiral (*PD-Japan-oldphoto*)

'Kate' torpedo-bombers from the first wave were armed with specially designed Type 91 aerial torpedoes that had been fitted with wooden fins so that they would run straight and not porpoise in the shallow waters of Pearl Harbor, while the B5N2 level-bombers each carried a single 800 kg Type 99 No 80 Mk 5 armour-piercing bomb. This weapon was actually a 16-inch naval gun shell specially fitted with fins, as there was no bomb of this size then available to the IJNAF that could penetrate almost six inches of armour plating.

Before sunrise on 7 December the first wave attack force, comprising 189 aircraft, took off from their carriers just north of Oahu. The unflappable and 'determined' Fuchida, seated in the navigator's seat of his specially marked B5N2, was in command of the first wave. Included in the first wave were 48 'Kate' level-bombers and 40 torpedo-equipped B5N2s from the First Air Group. The level-bombers formed up in four sections of 12 aircraft and the torpedo-bombers into four sections of ten 'Kates'.

The second wave of the Pearl Harbor air attack comprised 171 aircraft led by Lt Cdr Shigekazu Shimazaki (flying from *Zuikaku*), who, unlike Cdr Fuchida, was at the controls of his B5N2. Within the second wave were 54 'Kates' of the First Air Group, carrying 250 kg No 25 and 60 kg Type 2 No 6 Model 5 bombs. Half of these aeroplanes were to attack aircraft and hangars at Kaneohe, Ford Island and Barbers Point, while the remaining 27 'Kates' targeted Hickam Field.

Fuchida described the progression of events when the first wave aircraft reached Pearl Harbor;

'I took the binoculars and gazed at Pearl Harbor. "They're here, they're here." Battleships with tripod masts and cage masts. One, two, three . . . I followed with my eyes and counted in my mind. As expected, the full set of eight battleships was at anchor. I felt my temperature rise as I thought, "Thank goodness, they're here."

'Below me lay the whole US Pacific Fleet in a formation I would not have dared to dream of in my most optimistic dreams. I have seen German ships assembled in Kiel harbour. I have also seen French battleships in Brest. And finally, I have frequently seen our own warships assembled for review before the Emperor, but I have never seen ships, even in the deepest peace, anchored at a distance less than 500 to 1000 yards from each other. A war fleet must always be on the alert since surprise attacks can never be fully ruled out. But this picture down there was hard to comprehend. Had these Americans never heard of Port Arthur?

'I glanced at my watch. It was 12 minutes to 8.00 AM. If I issued the order to attack now, the first bomb would be dropped exactly at 8.00 AM. The air raid on Pearl Harbor was scheduled to commence at 8.00 AM. I looked back at the telegrapher. "Chief Petty Officer [CPO] Norinobu Mizuki, send the

message to all aeroplanes – All forces attack." Mizuki clicked the telegraphic key. It was the repeated transmission of a simple abbreviation. "To-To-To."

'"Commander, transmission of the attack message has been completed."

'"*Yosh*! (Good!)"

'The time was 7.49 AM, 7 December 1941. In Tokyo it was 3.19 AM on 8 December. As I look back, that moment signalled the raising of the curtain on the cursed Pacific War.

'Having given the command to attack, I turned around Barbers Point, guiding the level-bombing squadron under my direct control, trying to measure the timing to commence the attack. We could see the airfield at Barbers Point to our left, but there was not a single aeroplane there. I turned my eyes to Pearl Harbor. The area was still covered thinly with the morning mist. It was a quiet sight, and it might just have been me, but Pearl Harbor appeared to be asleep still.

'I looked back at the telegrapher. "Mizuki, send the message by *ko*-type radio wave. We have succeeded with our surprise attack."

'"Yes, Sir."

'As if having waited for the moment impatiently, the Chief Petty Officer immediately clicked the key. It was a repeated transmission of "*Tora-Tora-Tora*."

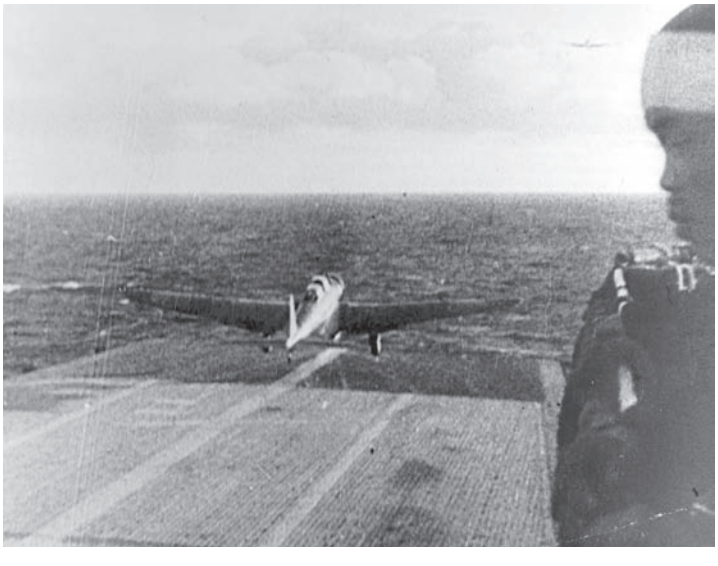
'"Commander, *Akagi* has understood the transmission of "*Tora-Tora-Tora*."

'"Good."

'It was 7.53 AM, four minutes after giving the order to all forces to attack.

'Later, I learned that this message had been received directly by Imperial Headquarters in Tokyo, as well as on board the *Nagato* anchored in Hiroshima Bay, before the message had been relayed by the *Akagi*. In those days we could not expect to deliver a message a distance of 3000 nautical miles with the limited power of a small telegraphic instrument mounted on an aeroplane. Thus, without losing time, "*Tora-Tora-Tora*" was broadcast to Taiwan, French Indochina, Malaya, Borneo, Hong Kong, Shanghai, Guam and Wake Island. And the Imperial Army divisions, stationed across Asia, which had been holding their collective breath to hear the outcome of our air raid, went into their respective planned combat actions.

'I was relieved to have reported "*Tora-Tora-Tora*" myself, but it was yet to be proved if the surprise attack would really succeed and annihilate the US Pacific Fleet. I stood up on the seat with the binoculars in my hands and started to give our combat orders, paying attention to the surrounding battle conditions. We soon saw black smoke coming up from both Hickam airfield



This still from a Japanese newsreel shows the last of the B5N2s taking off from *Shokaku* on 7 December 1941. All 18 'Kates' that participated in the operation returned safely to *Shokaku* (*US National Archives at College Park, MD, Still Pictures Branch*)

'Kate' aircrew pose for a photograph on *Kaga*'s flightdeck the day before their surprise attack on Pearl Harbor. Only a handful of these naval aviators have been identified, namely, first row, fourth from left, PO3c Yuji Akamatsu, second row, third from left, Lt Ichiro Kitajima, fourth from left, Lt Minoru Fukuda, and fifth from left, WO Takayoshi Morinaga, and fourth row, sixth from left, PO2c Takeshi Maeda. Kitajima led 12 B5N2s from *Kaga* in the torpedo attack on Battleship Row. *Kaga*'s level-bombing formation, led by Lt Cdr Takashi Hashiguchi, participated in the sinking of the battleship *Arizona* (*Yoshino Collection, PD-Japan-oldphoto*)

and Ford Island. Soon after, I saw columns of water rising one after another where the battleships were berthed. The battle was developing in our favour. Murata, who had seen the dive-bombing squadron hit the airfields, rushed to his targets before they were obscured by the black smoke. And at 7.57 AM the torpedo launched by Murata hit the battleship *West Virginia* and raised the first water column of our attack. The number of water columns increased in succession as the torpedo-bombers flew in.'

As one of the best torpedo-bomber pilots in the IJNAF at that time, Lt Cdr Shigeharu Murata had perfected the techniques required for the effective employment of torpedoes in the shallow waters of Hawaii. During the months leading up to the attack, he had taught his pilots how to achieve the tight launch parameters that were required to ensure success during the Pearl Harbor operation. The rigorous training regime Murata had established for the 'Kate' pilots was now paying off, the torpedo-bombers having split into two strings as they commenced their attacks. Lt Hirata Matsumura led eight aeroplanes from *Hiryu* down, followed by eight from *Soryu*, with Lt Tsuyoshi Nagai at their head. These aircraft closed on their targets on the northwest side of Ford Island, while 12 B5N2s led by Murata from *Akagi* and an identical number from *Kaga*, headed by Lt Ichiro Kitajima, angled south then east over Hickam Field and then up Battleship Row.

Aircraft reduced altitude and flight leaders singled out their designated targets. If a target was questionable, the pilot and his bombardier were ordered to make passes until they had reasonable certainty of a hit. If they could not acquire their target, they would then elect to strike another. Soon, multiple torpedoes were streaking towards their stationary targets. Shortly after Murata hit USS *West Virginia* (BB-48), six 'Kates' from Lt Nagai's formation hit USS *Utah* (BB-31) and USS *Raleigh* (CL-7). Nagai's weapon struck USS *Helena* (CL-50) and badly damaged both it and USS *Oglala* (CM-4) moored alongside. Nagai had realised too late that his target was not the battleship USS *Pennsylvania* (BB-38), which was in a nearby drydock rather than in its usual berth then occupied by CL-50. Indeed, there were reports from sailors on board the cruiser that several 'Kates', still loaded with torpedoes, overflew the ship to attack the battleships at Ford Island. Several also stated that some Japanese pilots aborted their attacks on *Helena* after realising that it was not *Pennsylvania.*

Lt(jg) Goto, flying to the left rear of Murata, targeted USS *Oklahoma* (BB-37), his observer crying 'It hit' as a large jet of water geysered into the air as the aeroplane climbed away. At least seven US Navy ships would be struck by Type 91 torpedoes dropped by 'Kates'.

Watching these attacks unfold below him, Cdr Fuchida turned his attention to guiding in the 49 'Kate' level-bombers that had now reached the harbour, having approached from over Barbers Point to disguise their attack path and avoid detection over land. His plan was to hit the single ships USS *California* (BB-44) and USS *Nevada* (BB-36) and inboard ships USS *Maryland* (BB-46), USS *Tennessee* (BB-43) and USS *Arizona* (BB-39). The 15 'Kates' from *Akagi* were led by Fuchida himself, with Lt Cdr Takahashi Hashiguchi leading *Kaga*'s 14 aeroplanes, Lt Heijiro Abe at the head of *Soryu*'s ten 'Kates' and Lt Cdr Tadashi Kusumi in charge of *Hiryu*'s ten B5N2s. Fuchida continues his account;

'I was satisfied as I observed the battle scenes. In any event, there was no time to order corrections. It was now time for the level-bombing squadron, under my direct control, and I guided them towards Pearl Harbor. Our targets were the battleships moored on the east side of Ford Island.

'"CPO Mizuki, send the *tsu*-repeat order to the level-bombing squadron." This was the attack order specifically meant for the level-bombing squadron. A *to*-repeat order was for the entire attack force. Our communications abbreviations were kept very simple, as simplicity is a fundamental principle of war strategy.

'The level-bombing squadron broke into ten groups of five aeroplanes each, forming a line astern. The aeroplanes kept a distance of 200 m in order to avoid the turbulence of the "fart" [the slipstream of the aeroplane in front]. This resulted in an extremely long line of aircraft. They were on a bombing course from the southwest to the northeast. Our bombing altitude was 3000 m.

'"Commander, I will position the bombing guide aeroplane to the front."

'"*Yosh*! (Okay!)"

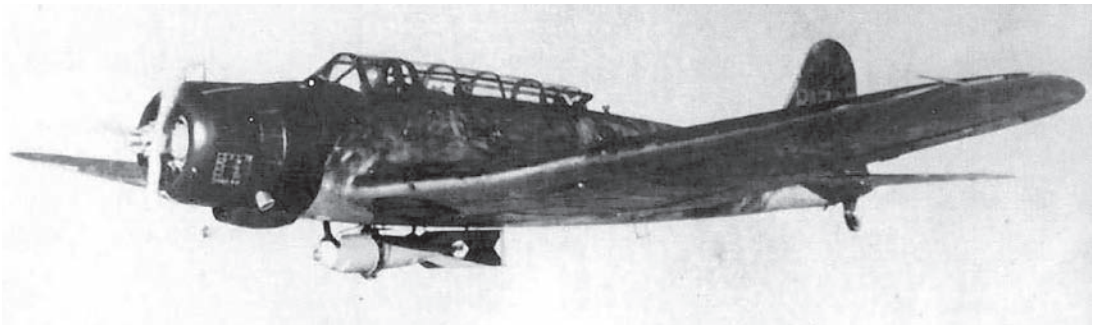
'The bombing guide aeroplane was currently following the lead aircraft. The pilot of the former was Chief Petty Flight Officer [CPFO] Shoichi Watanabe and the bombardier was CPFO Yanosuke Aso – an excellent combination, always having achieved outstanding performance in the fleet's bombing drills.

'My pilot, Lt Mitsuo Matsuzaki, sent a quick signal, to which Watanabe nodded. The first aeroplane increased its altitude slightly. The second advanced forward to take the lead position. And then the first aeroplane decreased its altitude and took the position previously held by the second. Thus, under the lead of the bombing guide aeroplane, the aircraft entered their bombing course. Looking like Bodhidharma, the famous bearded wide-eyed Buddhist monk from India, Aso could be seen through the windshield. As our eyes met he saluted, smiling. I raised my hand, signalling "Do your best", then he nodded, "You can depend on us."

'The targets for the level-bombing squadron under my direct control were the battleships anchored at the mooring posts on the eastern side of Ford Island, and it was decided that each bombing sub-squadron would select the targets in the order that they appeared from the north. Therefore, the target for the first bombing sub-squadron, which included my aeroplane, was the battleship *Nevada*.

'As expected, the enemy anti-aircraft fire flashed when we approached the entrance to Pearl Harbor. Based on the fact that they launched a counterattack five minutes after the start of our attack, I saw that they

Cdr Mitsuo Fuchida is seen here wearing a one-piece winter flightsuit, which was waterproofed but not fireproof, and trimmed with a rabbit fur collar. Note also his rank patch displayed prominently on his left sleeve. This photograph was taken in the late autumn of 1941, shortly after Fuchida had been promoted to commander (*Felix c, PD-Japan-oldphoto*)



Armed with a 250 kg Type 98 No 25 Land Bomb, this B5N2 was assigned to *Hiryu* during the Pearl Harbor operation – although this photograph was almost certainly taken either before or after the raid. *Hiryu*'s 'Kates' performed both level-bombing and torpedo attacks on Battleship Row. Each of the B5N2s that targeted the US Navy capital ships were armed with a single 800 kg Type 99 No 80 Mk 5 armour-piercing bomb (*PD-Japan-oldphoto*)

had been well prepared for battle. Enemy anti-aircraft fire concentrated on my sub-squadron group as we spearheaded the level-bombing attack. Through effective firing adjustments, the enemy barrage approached steadily. But we could not afford to deviate from our planned bombing course. Black smoke from bursting shells flowed around the aeroplane. It was not comfortable. The altitude was only 3000 m. I thought we would be hit. Ducking my head, I tried not to look, but then the explosion from a shell made me feel itchy around my buttocks. In an instant, a hole in the aircraft caused by shrapnel from the shell became big enough to see the sky through.

'With a banging sound, the aeroplane was severely rocked. Matsuzaki asked me, "Commander, where were we hit?"

'While I was going to check the damage myself, Mizuki responded, "A shell splinter hit the left rear of our fuselage and has ripped open a hole. The control cable was cut, and it's supported only by a single strand. I cannot reach it to fix it."

'I felt very uneasy, but we were in the midst of battle. It was no time to feel uneasy.

'"Matsuzaki, the control cable is almost cut. Don't make any sudden moves."

'"Yes, I got it. So far no problem, we're in control."

'"Good."

'Before long, we approached the targets. The course adjustments by the guiding aeroplane became even more precise. As everything would depend on the timing, I focused my full attention on the guiding aeroplane's bomb, holding the bomb release gear. At the moment the lead aeroplane released its bomb, those of us in the following four aeroplanes would drop our bombs all together.

'However, the guiding aircraft banked a bit, meaning that we would have to repeat our approach. I felt discouraged, as we would have to go through the barrage of anti-aircraft fire again. What I learned later from Aso was that, when they were very

Battleship Row comes under attack by IJNAF aircraft on 7 December 1941. Note the geyser of water caused by the first torpedo to hit *West Virginia* (on the far side of Ford Island, shown in the centre of this photograph). Two 'Kates' are just visible in the centre and top right of this shot, which came to light after the war. Other battleships in port include, from left to right, *Nevada*, *Arizona*, *Tennessee* (innermost to *West Virginia*), *Oklahoma* (which has already taken a torpedo hit and is starting to capsize), *Maryland* and *California* (*US Navy*)

close to the point of releasing their bomb, he made a misalignment due to a disturbance by a small cloud. No one in our attack squadron would drop a bomb that had been brought all the way to the sky above Pearl Harbor knowing that it would not hit its target. There was even a squadron group that repeated their approach three times until they were able to achieve a perfect alignment for their attack.

'Thus, my first bombing squadron group made a big turnaround to the right to repeat our attack approach. In the meantime, the second group that followed had started the level-bombing attack. It was 8.04 AM when they dropped their bombs.

'Then, when my first group was beginning the bombing run again, we saw a huge explosion among the battleships on the eastern side of Ford Island. Roaring flames and dark smoke flared high, rising up to 500 m. I intuitively judged it as an induced explosion. Soon, the shock waves reached our formation, even though we were quite far away. The aeroplane shook. Lt Matsuzaki, who was at the controls, raised his head in surprise. 'I advised him, "Matsuzaki, the enemy ship's magazine seems to have exploded". Matsuzaki opened the windshield, and, when he looked at the sight, the words that came out of his mouth were "*Bakayaro*, *zamamiro* ("You fools! Serves you right!")"

'This vessel that exploded and sank in an instant was the battleship *Arizona.* Two 800 kg No 80 armour-piercing bombs dropped by the second bombing group from the *Kaga* hit the ship, and the instant the second bomb hit the side of the *Arizona*'s second turret a huge explosion went off. This was confirmed by the commander of the *Kaga*'s second squadron, Lt Hideo Maki. Presumably, the bomb that hit the turret pierced through the armoured deck, hurtled into the forward magazine and triggered the explosion.

'The battle was at its full height. Black smoke filled the entire airspace over the battle area. With my binoculars I made a close surveillance of the battleships. The *Nevada* at the north end was burning, but there was an indication that the ship was going to move. The ship that had exploded, the *Arizona*, was second from the north. Both the *West Virginia*, third on the outside, and the *Tennessee*, berthed on the inside, were enveloped by fierce flames. The fourth on the outside, the *Oklahoma*, had already capsized. The *Maryland*, on the inside, somehow still seemed to be in good condition, so I decided to target that ship. I sent a hand signal to the guiding aeroplane – "Aim at the *Maryland*, the fourth ship on the inside." CPO Abe nodded.

'My first squadron group was on the bombing course again. Suddenly, we were attacked by a barrage of anti-aircraft fire that was even fiercer than before. "Boom" – we felt a shock. The third aeroplane in our formation seemed to take

Arizona smoulders following the devastating IJNAF surprise attack on Pearl Harbor. According to IJNAF reports the ship had initially been hit in the aft section by five 'Kates' from *Kaga*, although the Japanese actually credited *Hiryu*'s B5N2 group commander, Lt Cdr Tadashi Kusumi, and his crew with *Arizona*'s destruction. The five aeroplanes from *Hiryu* had been the second 'Kate' formation to attack the battleship. Of the five bombs they dropped, one struck *Arizona* near its No 2 turret and the battleship duly exploded, whilst a second bomb hit the repair ship *Vestal* (*US National Archives at College Park, MD, Still Pictures Branch*)

a hit from a shell fragment. The wires holding its bomb harness were cut, and the bomb was falling. I was relieved, as it was a near hit, but it was useless to have an aeroplane without bombs stay with the formation. I sent a hand signal to the third aeroplane, "Leave the line, and go back alone." Then I looked down to see the ripples on the water made by the bomb. There was a minesweeper-like ship nearby. At least the bomb had an effect and surprised the ship. I looked more closely and realised that it was a gate net. And now, because the bomb had exploded, the gate net was being closed.

'Since I had ordered the third aeroplane to return, my attack group now consisted of four aeroplanes. We focused once again on the target, the *Maryland*, and the signal from the guide aeroplane indicated "Ready for release." Breathless, gripping the bomb release, I waited for the moment to arrive. "Bombs away!" I pulled the bomb release, watched the bomb glide gently downward, then I lay on the seat to watch the descent of the falling bomb from the lower window. Four armour-piercing bombs were going down side-by-side.

'There is nothing so thrilling in the world than to see whether the bomb you have just dropped will hit its target. Before long, directly in front of the bombs, which were moving in a straight line, the *Maryland* came closer. The bombs became smaller and smaller to the point that we would lose sight of them if we blinked. I stared, holding my breath. I felt a spine-tingling thrill. As soon as the bombs became pinheads, two white puffs of smoke shot up from the deck of the *Maryland*. "Two bombs have hit!" Since delayed fuses were installed in our armour-piercing bombs, they emitted white smoke when they hit the upper deck.'

Amongst the 'Kate' crews to be singled out for successfully hitting their targets were WO Haruo Sato (pilot), PO1c Noboru Kanei (bombardier) and PO2c Yoshikazu Hanada (radio operator/gunner) from *Soryu*, who purportedly dropped the 800 kg bomb that penetrated near *Arizona*'s No 2 turret and caused its forward ammunition magazine to spectacularly explode. Official Japanese reports, however, noted that he had targeted *West Virginia* and *Tennessee*, with five 'Kates' from *Kaga* having been the first to hit *Arizona*, in the aft section of the ship. The IJNAF actually credited *Hiryu*'s B5N2 group commander, Lt Cdr Tadashi Kusumi, and his crew with *Arizona*'s destruction, the five aeroplanes from this carrier having been the second 'Kate' formation to attack the battleship. Of the five bombs they dropped, one struck *Arizona* near its No 2 turret and the battleship duly exploded, and a second bomb hit the repair ship USS *Vestal* (AR-4).

California, ravaged by bombs and torpedoes, begins to slip beneath the waves near Ford Island. Also visible are the destroyer USS *Shaw* (DD-373), on fire to the left, and *Nevada* beached at left centre. All three ships were hit by 800 kg Type 99 No 80 Mk 5 armour-piercing bombs dropped by the 49 'Kate' level-bombers led over Ford Island by Cdr Fuchida (*US National Archives at College Park, MD, Still Pictures Branch*)

Kanai was one of ten 'Kate' bombardiers given intense training for the attack on Battleship Row, these men being seen as 'champions' by their peers in the IJNAF – the

lead bombardier in the *Hiryu* formation that hit *Arizona* and *Vestal* was PO1c Shomatsu Kobayashi. The remaining 39 bombardiers simply dropped their ordnance when the 'champion' – in the lead B5N2 in each formation – released his. Having hit at least 13 ships, all the level-bombers then left the area, bar the aircraft flown by Cdr Fuchida;

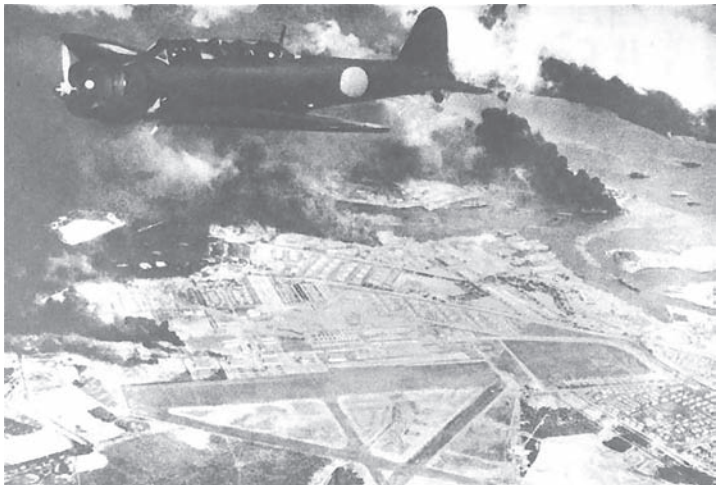
'At this point in time, just as the first wave attack was almost ending, the second wave squadron of 167 aeroplanes [but no torpedo-laden B5N2s], led by Lt Cdr Shigekazu Shimazaki, was joining the battle.

While the crew of *Nevada* (two of its main turrets are visible to the right) battled shipboard fires, the destroyer *Shaw* exploded when a direct hit from an 800 kg bomb dropped by a 'Kate' hit the vessel's forward magazine while the ship sat in dry dock. The destroyer's bow was blown off in this explosion, *Shaw* having been hit by four bombs (some dropped by 'Vals') in total (*US National Archives at College Park, MD, Still Pictures Branch*)

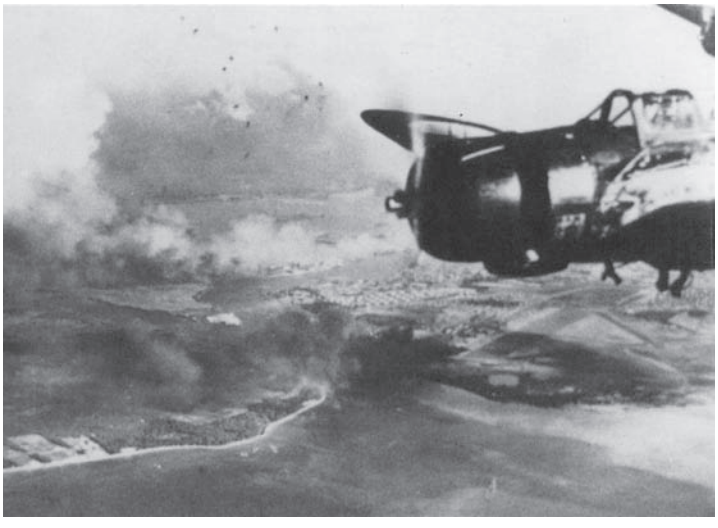
'While I had the first wave squadrons return to their mother ships, my aeroplane alone from the first wave remained in the sky above Pearl Harbor. My role was to provide battle instructions to the second wave squadrons, as well as to provide surveillance of our achievements in battle.

'Shimazaki reached Kahuku Point at 8.40 AM and gave the command for deployment. At 8.54 AM he gave the command to attack, whereupon 78 dive-bombers led by Lt Cdr Egusa rushed to join forces from the east of Pearl Harbor. At that time Pearl Harbor was covered with black smoke, and this hindered our view. Fearless, Egusa started to dive against the funnel of concentrated anti-aircraft barrages shooting up through the black smoke. As he came down through the smoke he could clearly see the ship which was firing at him, and then he bombed it. There is a proverb that says "The pheasant would not be shot but for its cries."

'If the enemy ships had not been shooting at him, it would have meant that those silent ships were already damaged. Egusa's method under fire was to aim at undamaged ones. It worked perfectly, and did not duplicate the first wave attack.



A B5N2 from *Zuikaku* flies over a devastated Hickam Field and Pearl Harbor. At the right rear of this photograph can be seen *California*, the tanker *Neosho*, the smoking dry docks and Battleship Row. This aeroplane was one of 27 'Kates' from *Zuikaku* that targeted Hickam Field as part of the second wave attack. Each of these aircraft was armed with 250 kg Type 98 No 25 Land Bombs, which were dropped on hangars and barrack blocks with devastating effect. Indeed, Hickam's losses in terms of men (220 killed) were considerably higher than those suffered by Oahu's other airfields, and the IJNAF destroyed more than one-third (19) of the base's medium and heavy bombers (*US National Archives at College Park, MD, Still Pictures Branch*)



With their torpedoes expended, two B5N2s from *Kaga* leave a devastated Pearl Harbor behind them following the first wave attack on Battleship Row. Twelve 'Kates' targeted the Pacific Fleet's capital ships on 7 December, their attack being led by Lt Ichiro Kitajima. Fourteen more from *Kaga* conducted horizontal bombing against these vessels as part of the 49-strong force led in by Cdr Fuchida. No fewer than five of *Kaga*'s torpedo-laden B5N2s were lost to AA fire, as they were the last to attack the battleships (*PD-Japan-oldphoto*)

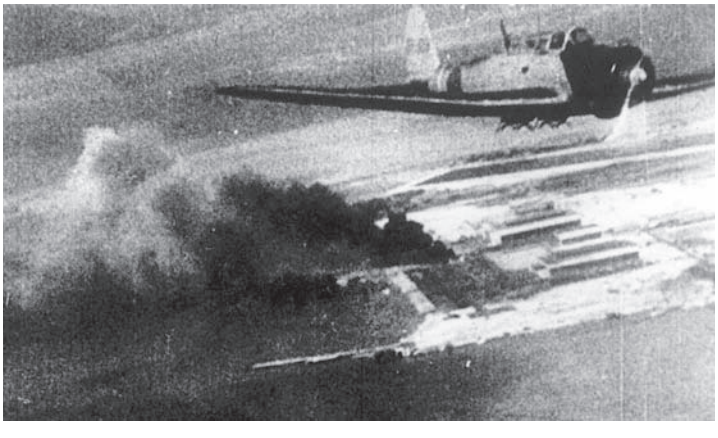
'While the main force of the level-bombing squadron, 54 aeroplanes under Shimazaki's direct command, attacked Hickam airfield, some of them also attacked hangars on Ford Island and Kaneohe. The bombing altitude was 1500 m, and under the clouds. It was a miracle that not a single aeroplane was lost, flying at this low altitude and enduring such fierce anti-aircraft fire. Nevertheless, close to half – more than 20 aeroplanes – were hit and needed repairs, leaving them unusable for repeat attacks.

'The first wave of the air-superiority squadron, led by Lt Cdr Shigeru Itaya, secured control of the sky above Oahu. Then the second wave of 35 aeroplanes, led by Lt Saburo Shindo, moved in to strafe each airfield and achieve more of our battle objectives.

'The first point of my role as General Commander was to give proper battle instructions in order to avoid having our forces attack the same targets twice. Without battle commands the squadrons would be tempted to concentrate on the same targets, leaving some untouched. Therefore, I instructed them to exert maximum battle performance by directing the attack all around with equal attention. The second point was to make an accurate surveillance of our battle achievements. If reported battle achievements were based on incorrect surveillance the result could be misjudgements of the enemy's capabilities in battles to follow.

'The first and second waves were finished. I stayed alone in the sky above Pearl Harbor for three hours in the lead aeroplane, exhausting all my energies giving battle instructions and conducting surveillance of the post-battle situation.'

A B5N2 from *Shokaku* leaves a devastated NAS Kaneohe in its wake on 7 December 1941. Nine 'Kates' from this carrier also attacked NAS Pearl Harbor on Ford Island with 250 kg bombs, as well as targets of opportunity such as the ammunition ship USS *Pyro* (AE-1) in West Loch (*Keystone/ Getty Images*)



In addition to decimating the bulk of the Pacific Fleet at anchor in Pearl Harbor, the IJNAF's carrier-based B5N2 'Kates' delivered a serious blow to American land-based air power on the Hawaiian Islands thanks to the Japanese crews enjoying the element of surprise in their attacks on US military installations. More than 2000 sailors were killed and 710 wounded, whilst the USAAC suffered 218 deaths and 364 wounded. US Marine Corps casualties amounted to 109 killed and 69 wounded. Finally, 68 civilian personnel were lost and 35 wounded in the surprise attack.

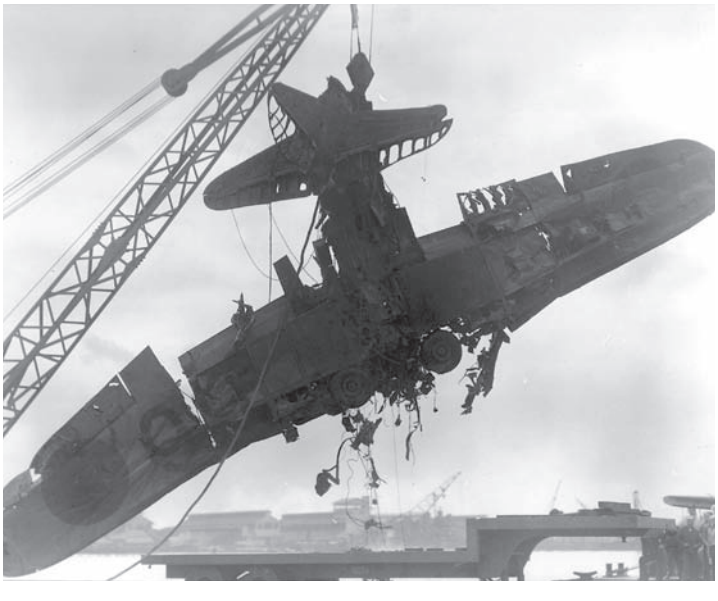
Eighteen warships were sunk or beached during the raid, most notably five battleships (*Arizona*,

Oklahoma, *West Virginia*, *California* and *Nevada*) being sent to the bottom of Pearl Harbor. American aircraft losses during the surprise attack included 92 US Navy aeroplanes destroyed and 31 damaged and 77 USAAC aeroplanes destroyed and 128 damaged. However, the IJNAF failed to sink the Pacific Fleet's three aircraft carriers (*Enterprise*, *Lexington* and USS *Saratoga* [CV-3]) or destroy vital fuel depots and ship refuelling facilities. Had the IJNAF achieved these goals, America's 'island hopping' campaign that commenced in late 1942 would have been virtually impossible to mount and a Japanese invasion of the US West Coast a distinct possibility.

The IJNAF had lost 29 aircraft during the two-wave strike on Pearl Harbor, including five B5N2s conducting torpedo runs during the first wave. All of these machines were from *Kaga*, whose aircraft were the last to attack Battleship Row. Although the Pacific Fleet had been hit hard, the sailors manning the AA guns now fought back with an almost fanatical ferocity that saw the harbour alive with muzzle flashes. All bar one of the 'Kate' level-bombers that participated in both the first and second waves returned to their respective carriers – a solitary aeroplane ditched near its carrier and the crew was rescued from the water.

Five hours after the Pearl Harbor raid, the IJNAF supported the first attacks on the Philippines in preparation for invasion. Only a single light carrier, *Ryujo*, was assigned to this campaign, with Formosa-based fighters and bombers flying the bulk of the missions. Nevertheless, 13 B5N1s and B5N2s, escorted by nine A5M 'Claude' fighters, took off from *Ryujo* shortly after dawn on 8 December to attack Davao naval base on Mindanao, in the southern Philippines. The bombers unsuccessfully attacked the seaplane tender USS *William B Preston* (AVD-7), although the 'Claudes' sank two PBY Catalinas. One of the B5N2s was hit by return fire and forced to ditch during its return flight to *Ryujo*, its crew being successfully rescued. A second strike was made three hours later by three 'Claudes' and two 'Kates', with oil tanks and an unidentified ship being targeted.

On 12 December *Ryujo*'s aeroplanes, accompanied by floatplanes from IJN tenders supporting the Philippine campaign, covered landings at Legaspi, on the southeastern tip of Luzon. Eight days later *Ryujo* escorted 14 transport ships carrying troops from Palau to Davao for the invasion of Mindanao, its 'Claudes' and 'Kates' taking part in a successful attack on Del Monte airfield in northern Mindanao. Twelve B5Ns also bombed a 5000-ton British tanker near Davao on 20 December. On the 23rd, with Mindanao now in Japanese hands, *Ryujo* sent seven 'Claudes' and two 'Kates' on detachment to Davao in preparation for the assault on the Dutch East Indies.



The opening strike of the Pearl Harbor raid, timed to begin at 0755 hrs, was intended to comprise the torpedo-carrying 'Kates', 40 in all. The attack was planned to take only 90 seconds, the vulnerable low-flying aircraft releasing their torpedoes and then heading back out to sea before the AA batteries could react. However, confusion in the attack meant that it took a full 11 minutes for them to release their weapons. By the time the final 'Kates' from *Kaga* commenced their run in on Battleship Row, the AA gunners on the various warships and shore installations were throwing up a deadly hail of fire that the B5N2s had to penetrate while flying straight and level in order to achieve accurate torpedo drops. Five of *Kaga*'s 'Kates' were shot down, including this aircraft, flown by Lt Mimori Suzuki, which was hit as it flew low over submarine pens in Pearl Harbor. A chance bullet struck the warhead of Suzuki's torpedo and detonated it, causing the aeroplane to explode in mid-air. Several weeks later US Navy divers raised the wreck from the bottom of the harbour, its three-man crew still strapped into the cockpit (*US National Archives at College Park, MD, Still Pictures Branch*)

That same day (23 December), Japanese troops landed on Wake Island, in the western Pacific, following stiff resistance from US Marine Corps fighter squadron VMF-211, equipped with F4F Wildcats, and the small garrison charged with defending the coral atoll. B5N2s from *Hiryu* and *Soryu*, which had been detached from 1st Air Fleet during its return to Japan from the Hawaiian operation, had participated in large-scale strikes on Wake for three days from 21 December. Although these attacks eventually destroyed all the Wildcat fighters on the island, knocked out 5-inch defensive gun batteries and disabled AA fire control equipment, three 'Kates' from *Soryu* had in turn been shot down on the 22nd by the last two airworthy F4Fs moments before they too were despatched by Zero-sens. Amongst the six IJNAF crew killed was champion bombardier PO Noboru Kanai.

Troops came ashore on the morning of the 23rd under the protective umbrella of the two carrier air groups, with *Soryu* launching three waves of aeroplanes, including nine B5N2s that were each armed with two 250 kg bombs – they were led by Lt Tsuyoshi Nagai, who had torpedoed *Helena* in Pearl Harbor earlier in the month. Despite running low on ammunition, the defenders continued to resist, prompting Japanese troops to call for close air support. Nagai and his wingman, PO2c Juzo Mori, descended to reconnoitre the area, and they were met by AA fire from a 3-inch anti-boat gun that hit both aeroplanes multiple times. These aircraft were the only ones in the third wave to be damaged. Lacking a forward-firing gun to engage the battery, Nakai overflew the emplacement to allow his radio operator/gunner to fire on it with his flexible-mount 7.7 mm weapon.

Hiryu also launched two waves of aeroplanes (the first including nine B5N2s led by Lt Matsumura) on the 23rd in support of the invasion, its aircraft arriving over the island after *Soryu*'s. The second wave, which included nine 'Kates' led by Lt Cdr Kusumi, dropped 60 kg bombs in what proved to be the final action of the Wake invasion. The atoll was in Japanese hands by 1400 hrs, and later that day *Hiryu* and *Soryu* departed the area.

With the Japanese conquest of Southeast Asia and the South Pacific continuing unabated in the early weeks of 1942, the IJN now sent four carriers to northern New Guinea. B5N2s embarked in these vessels would see considerable action as level-bombers during strikes against Rabaul that preceded its invasion on 23 January. Three days earlier, Cdr Mitsuo Fuchida had led 109 aircraft from *Akagi*, *Kaga*, *Zuikaku* and *Shokaku* in a raid on Rabaul's port facilities and ships in nearby Simpson Harbour – 47 "Kates" were involved in this mission, flying from *Akagi* and *Kaga*. The B5N2s bombed Lakunai airfield and targeted the Norwegian freighter *Herstein*, *Kaga* losing a "Kate" to anti-aircraft fire. A second machine ditched near the IJN task force and its crew was rescued. On 21 January 18 "Kates" from *Zuikaku* were part of a formation that bombed Lae, while *Shokaku* sent six B5N2s to attack Salamaua and nine to target Madang.

Three days later *Soryu* and *Hiryu*, which were supporting operations in the Dutch East Indies, sent a force totalling 54 aeroplanes to attack Ambon during the landings at Kendari, with harbour facilities, gun batteries and barracks being hit. No enemy shipping or aircraft were encountered. With the completion of this raid, *Soryu* and *Hiryu* returned to their anchorage at Davao, in the southern Philippines, to prepare for their next operation.

In stark contrast to the attack on Pearl Harbor, this series of strikes in support of operations in New Guinea had offered few targets of value. Cdr Mitsuo Fuchida would write that the entire operation was akin to wielding an ox blade to chop a chicken.

Although the B5N2 force embarked in *Ryujo* was significantly smaller than that aboard the larger fleet carriers, "Kates" flying from the smaller 'flattop' continued to see plenty of action during the early months of 1942. On 15 February, for example, *Ryujo*'s level-bombers went into action against a flotilla of five cruisers and nine destroyers during four separate attacks as IJNAF carrier aeroplanes began targeting shipping leaving Singapore. One of those attacked by the B5Ns was the cruiser HMS *Exeter*, whose commanding officer, Capt Oliver Gordon, later wrote;

'Each wave of bombers as it came towards its target received a hot reception from the Allied ships and then, as the bombs dropped, the target ships would make independent and rapid alterations of course. Seconds later, the sea would be alive with great soaring sheets of water.'

As *Ryujo*'s 'Kate' crews had quickly discovered, fast, manoeuvring Allied warships were hard to sink when medium-altitude bombing techniques were employed. *Ryujo*'s air group again failed to register any hits against Allied vessels on 26 February. No torpedo attacks were carried out by the B5Ns from the ship at this time due to a lack of crew training and inadequate maintenance carried out on the weapons on board the carrier. Nine days earlier, however, 'Kates' from *Ryujo* had succeeded in sinking the grounded Dutch destroyer *Van Ghent*, which had hit a reef during the evacuation of Java.

DARWIN RAID

On 19 February, in a repeat of the large-scale air strike on Pearl Harbor some two months earlier, the carriers *Akagi*, *Kaga*, *Soryu* and *Hiryu* launched 188 aircraft in a pre-emptive strike on Darwin, capital of Australia's Northern Territory. This attack was conducted in order to prevent the Allies from sending reinforcements to defend Java. Australian historians Dr Tom Lewis and Peter Ingman detailed the 'Kate's' important role in this strike in their 2013 volume *Carrier Attack – Darwin 1942*;

'At nearly 1000 hrs on Thursday, 19 February 1942, sailors on more than 60 ships in Darwin harbour, as well as soldiers and civilians in the town, sighted masses of aircraft flying towards them. Many observers thought they were Allied machines, because the aircraft were approaching from the southeast – the very opposite direction from where an attack was expected to come.

'This momentary misconception was quickly dispelled when the oncoming aircraft began their raid. There were 179 Imperial Japanese Navy machines overhead – another nine were already engaged at the other end of the harbour – armed with guns and bombs, and they had been launched from four aircraft carriers less than 200 miles away. They were the experienced warriors who had destroyed Pearl Harbor two-and-a-half months previously. Now, in one of their commander's words, they were "the sledgehammer to crack an egg", and they set about their work in deadly earnest.

'A squadron of American P-40 fighters was present over Darwin that day, but the inexperienced pilots were no match for their elite Japanese counterparts. They fought bravely, but within minutes all but one had been swept from the skies. The Japanese level-bombers were able to go about their business unhindered, bombing in perfect formation from 10,000 ft.

'The B5N2 "Kates" were the heavyweights of the attack force. They were designed to carry a torpedo or a gravity-dropped 800 kg bomb. The latter weapon was an extremely heavy piece of ordnance by the standards of early 1942. As a comparison, at this time the Royal Australian Air Force's Lockheed Hudson – while possessing twin engines as opposed to one – would most commonly attack with two or four 120 kg bombs. The heaviest bombs carried by US Navy carrier-based aircraft at that time were "thousand pounders" (500 kg). A single hit by an 800 kg bomb could sink a large ship or demolish a building. Aside from explosive power, the kinetic energy of such a heavy bomb was immense and could potentially punch a hole straight through the hull of a merchant ship.

'The Japanese had good intelligence about the Darwin port and air base. However, they were less likely to know exactly what ships were in harbour. So the prime target would be the Stokes Hill wharf, which was the only facility where large merchant ships could dock in Darwin. Destroying this would mean no large ships could effectively use Darwin as a base. Given the steel structure of the wharf, the 800 kg bombs carried by the "Kates" could destroy it, and also sink ships moored to the wharf. It was the primary target for the level-bombers.

'Other pre-determined Japanese targets are less clear, but probably included the oil tanks, as well as any large ships anchored in the harbour. [Cdr Mitsuo] Fuchida later recalled that he led "the main strength of my level bombers in an attack on the harbour installations and a nearby cluster of oil tanks". The airfield hangars and facilities were also designated targets, but could easily be dealt with by the lighter bombs carried by the dive-bombers, and the strafing fighters with their 20 mm cannon.

'The destructive power of the "Kates" meant they would spearhead the attack. As a "Kate" flyer himself, Fuchida appears to have ensured the "Kates" had "clear skies" for their attack runs so as to achieve the best accuracy. The bombs would be dropped from 10,000 ft. Numerically, the B5Ns made up almost half of the attacking aircraft – 81 in total. They appeared over the target in four groups, one from each carrier. Fuchida himself led the first formation from *Akagi* – two "Vs" each of nine aircraft. *Kaga* – which had more aircraft than the other carriers – followed with three "Vs" of nine. It was these most eyewitnesses saw as a result of looking up upon hearing the *Akagi* bombs exploding. Following last were 18 bombers each from *Soryu* and *Hiryu*.

The ammunition ship *Neptuna* explodes after suffering a direct hit from an 800 kg bomb dropped from a 'Kate', the merchantman being berthed alongside Darwin's Stokes Hill wharf at the time of the 19 February 1942 attack. The corvette HMAS *Deloraine* is dwarfed by the mushroom cloud in the foreground (*Tony Holmes*)

'The flagship *Akagi*'s 18 B5Ns were the first over the target, and the accuracy of the first chutai [squadron] of nine aircraft led by Fuchida himself was extraordinary. It was these first huge 800 kg bombs that smashed the main wharf where the merchant ships *Neptuna* and *Barossa* were berthed. In seconds the capacity of Darwin as a large ship port had been eliminated. These were the first bombs dropped on the Australian landmass – the time was around 0958 hrs. The second *Akagi* chutai had less success, claiming a "near miss" off the bow of a large "merchant ship". This may have been the nearby depot ship HMAS *Platypus*, which was near-missed a number of times.

'The 27 "Kates" from *Kaga* followed behind the *Akagi* formations. The first two chutais (18 aircraft) dropped their bombs on land, and hits on the "city-office area" were claimed. Among other buildings damaged, such as the police barracks and Government House, the devastating hit on the Post Office was the most serious. It is not known whether these bombs were aimed at nearby military targets, such as the wharf and the oil tanks, or simply on the city itself. However, given Fuchida mentioned the oil tanks were a target, and they were not hit by the "Kates", it was probably these bombs that over-shot and instead hit the city area.

'The third chutai from *Kaga* dropped their bombs near the wharf, claiming a direct hit on it and near missed two merchant ships. In fact, the direct hit was probably on *Neptuna*, which was unloading [munitions] alongside the wharf. *Neptuna* did take a direct hit at this time that smashed her superstructure and set her on fire.

'The 18 B5Ns from *Soryu* were arranged in three six-aircraft chutais rather than the usual nine-aircraft chutai as used by all of the other carrier groups. One of these chutais dropped their bombs on land, claiming hits on "barracks". This was a reference to the bombs that landed near the hospital, which was close to the army barracks at Larrakeyah. The other 12 "Kates" reported "minor damage" to three large merchant ships.

'The 18 B5Ns from *Hiryu* bombed ships in the harbour and claimed a hit on a large merchant ship (either *Meigs* or *Mauna Loa*) and an oil tanker, presumably *British Motorist*, which was claimed as sunk. While a few of these bombs did create serious damage, probably the majority fell harmlessly into the ocean or were near misses. Except for the *Soryu* aircraft, the "Kates" attacked in formations of nine, resulting in a matching pattern of nine bombs. Thus for those formations that attacked particular ships, if one hit was made then the eight other bombs would miss, as no other target was close enough.

'Overall, Fuchida's level-bombers did enormous damage with their 800 kg bombs, even if only a moderate percentage hit their targets – normal enough for gravity-dropped bombs with only the initial aim from the bombardier as their guidance. It is difficult to know exactly which ships were hit or sunk by dive-bombers or level-bombers or shared, but a hit from an 800 kg bomb was vastly more damaging than a single hit from one of the "Val" dive-bombers, which carried much lighter 250 kg bombs. Along with *Neptuna*, the largest ships sunk – *Mauna Loa*, *Meigs* and the tanker *British Motorist* – were most likely victims of the "Kates", although they may have been subsequently dive-bombed as well.

'In some ways, in the absence of aerial opposition, the "Kates" had the easiest mission. Presumably, Fuchida's technique from Pearl Harbor was followed

Darwin's Stokes Hill wharf was broken in two at its junction after the first raids, having been hit by several 800 kg bombs dropped by B5N2s from *Kaga*. This photograph was taken either on 19 or 20 February, as the railway carriages on what remained of the wharf had not yet been recovered (*Tony Holmes*)

and each chutai of nine bombers dropped upon the release of the lead aeroplane. This is partially because the Japanese had only primitive bombsights in 1942 but they achieved some incredible accuracy due to the skill and experience of pilots such as Fuchida. They made their bomb runs and then made their way back to the carriers, the three-seat "Kates", with their better navigation abilities, leading other aircraft on the return leg of the mission. They had no secondary targets, and did not need to come down to low altitude.

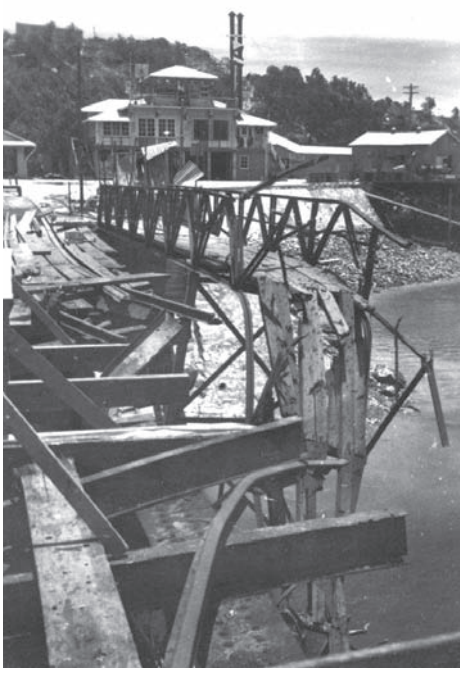
'However, the Japanese did not have it all their own way. None of the *Akagi* aircraft were hit. They were the first over the target and by the time their bombs were exploding, the AA gunners were targeting the next formation. The 3.7-inch army AA guns were quickly put into action, and at 10,000 ft, the attackers were well within range. The AA gunners estimated the altitude of the bombers and fused their shells to explode at that height. In this way they hoped to damage the aircraft with shrapnel or put off their aim. Only an extremely lucky shot would be a direct hit.

'One of *Kaga*'s "Kate" chutais, which bombed the "city office" area, reported damage to seven of its nine aircraft – this can only have been shrapnel damage from these army AA guns, as other weapons were out of range. But quickly adding to these were the 4-inch high-angle guns from the sloops HMAS *Swan* and HMAS *Warrego*. So the Darwin defenders were able to hit back – in total, 15 of the "Kates" reported some damage. But this was probably after they'd dropped their bombs – there is no evidence these guns were able to deter the high-level attackers.

'There is evidence that one of the damaged "Kates" made a forced landing near the carriers. This machine had received damage to its undercarriage, including a punctured tyre. The aircraft was part of the first *Kaga* chutai that had evidently received a very accurate barrage of AA fire. Seven of the nine aircraft in this formation were damaged. The crew was picked up by the destroyer *Tanikaze*.

'One obvious question is why didn't the "Kates", or at least some of them, attack with their deadly torpedoes instead? It would seem certain that more ships would have been sunk if torpedoes were employed. Most of the major ships were at anchor at the very start of the attack – very simple stationary targets for torpedo-bombers. There was plenty of depth in the harbour too, although at Pearl Harbor the Japanese had been able to launch torpedoes in vastly more confined conditions. Hits below the waterline by torpedoes would have been fatal to the merchant ships present. However, torpedoes were expensive and complex munitions, and the Japanese enforced a certain economy in their use. While the Japanese torpedoes were excellent, they were rarely used except against first-class targets such as aircraft carriers or capital ships. The opinion of Fuchida would seem that Darwin was not worth the expense or bother. The job was done using bombs instead.'

ATTACKING JAVA AND CEYLON



Darwin's Civil Aviation wharf was also wrecked by the 'Kates" accurate level bombing. Behind the wharf is the hill with the (still-present) Administrator's house on its summit (*Tony Holmes*)

With Darwin neutralised, the IJN ordered Mobile Force to head back towards Java to help in the search for Allied shipping still attempting to save the Dutch East Indies. Between 27 February and 5 March, carrier air groups located and sank five warships and a merchantman, with six B5Ns from *Ryujo* despatching the destroyer USS *Pope* (DD-225) on 1 March shortly after the ship had participated in the Second Battle of the Java Sea.

On 5 March Mobile Force launched a major attack on the East Indies, Cdr Fuchida leading a total of 149 aircraft in two waves against the port of Tjilatjap, which was now the sole remaining point of evacuation from Java. The first wave consisted of 45 B5N2 level-bombers from 1st Koku Sentai, while the dive-bomber contingent, led by Lt Cdr Egusa, came from 2nd Koku Sentai. Fighter escort was provided by nine Zero-sens each from *Akagi* and *Kaga*. The second wave was made up entirely of aeroplanes from 2nd Koku Sentai, these being 18 B5N2s from *Soryu* and 17 from *Hiryu*, with each carrier providing nine escorting Zero-sens. The 'Kates' devastated the town, while the 'Vals' concentrated on shipping in the harbour. There was no aerial opposition, and all aeroplanes returned without loss.

Six carriers were involved in the IJN's next audacious campaign, which would see Japanese aircraft strike targets in the Indian Ocean. A powerful force departed Staring Bay, in the Celebes, on 26 March, passing through the gap between Timor and the southernmost tip of the Javanese islands and then heading west until the afternoon of the 30th. The ships then headed northwest, directly for Ceylon – or, more specifically, Colombo, home of the Royal Navy's substantial Eastern Fleet. Five large carriers (*Akagi*, *Soryu*, *Hiryu*, *Shokaku* and *Zuikaku*) of 1st Koku Sentai Fleet were joined by four battleships, two heavy cruisers, one light cruiser and 11 destroyers, as well as seven submarines. A sixth carrier, the small but combat-proven *Ryujo*, was operating with the Malaya Force in the Bay of Bengal – its air group consisted of 12 A6Ms and 15 B5N2s.

At 0600 hrs, in the predawn darkness of Easter Sunday, 5 April 1942, Vice Admiral Chuichi Nagumo's carriers began launching a total of 53 'Kates' (17 from *Akagi* and 18 each from *Soryu* and *Hiryu*), 38 'Vals' (19 each from *Zuikaku* and *Shokaku*) and 36 Zero-sens (nine each from *Akagi*, *Soryu*, *Hiryu* and *Zuikaku*). With the task force having been spotted the previous day by a patrolling RAF Catalina, the 'Vals' from *Akagi*, *Soryu* and *Hiryu* and the torpedo-armed 'Kates' from *Zuikaku* and *Shokaku* were held in reserve in case Admiral Sir James Somerville's Eastern Fleet was met at sea. The latter was some 600 miles further west refuelling at its new, secret, anchorage in Addu Atoll, in the Maldives.

For the fifth time since Pearl Harbor, Mitsuo Fuchida led the attack force of 127 aircraft in the observer's seat of *Akagi*'s lead 'Kate'. Zero-sens sweeping ahead of the main formation made short work of six Swordfish of 788 Naval Air Squadron that were caught in the air over the harbour

Twelve of *Zuikaku*'s A6M2 Zero-sens (in the foreground) and 17 B5N2 'Kates' are readied on the flightdeck probably during the Indian Ocean operation of April 1942 (*Universal History Archive/Getty Images*)

as they headed for Ratmalana, Colombo's principal airfield to the southeast. As the main Japanese formation arrived over the harbour, Fuchida gave the attack order at 0745 hrs.

While RAF Hurricanes and Fleet Air Arm Fulmars engaged 'Val' dive-bombers and their Zero-sen escorts, the B5N2s from *Soryu* arrived over Colombo harbour at 0756 hrs, followed by those from *Hiryu* at 0805 hrs and *Akagi* at 0808 hrs. Their Zero-sen escorts from *Zuikaku* kept British fighters at bay, and although five 'Kates' were damaged, they all made it back to their respective carriers. The B5N2s had concentrated their attacks on port facilities, and they had also managed to sink the destroyer HMS *Tenedos* and the armed merchant cruiser HMS *Hector* and damage the submarine depot ship HMS *Lucia* and the merchant ship *Benledi* with their 800 kg bombs.

Having observed many ships still in harbour and continued opposition by AA fire and enemy fighters, Cdr Fuchida radioed the task force at 0828 hrs requesting preparation of a second attack. Nagumo's seaplanes had been out searching for the British fleet since early morning but had reported nothing so far. Thus, at 0852 hrs, the admiral ordered his reserve force of 'Kates' aboard *Zuikaku* and *Shokaku* to replace their torpedoes with bombs for a second strike on Colombo. About a third of the B5N2s on the other carriers were ordered to exchange their ordinary bombs for land bombs.

At 1000 hrs two Royal Navy cruisers were spotted, and shortly thereafter Nagumo ordered *Zuikaku* and *Shokaku* to despatch B5N2s to attack these ships with torpedoes. Chaos ensued on the carriers' hangar decks as the ordnance crews, who had been in the process of re-arming the aeroplanes with bombs, now frantically reversed course and began arming them with torpedoes once more. At 1050 hrs, however, a seaplane from the light cruiser *Abukuma* mistakenly reported the enemy ships as destroyers. At 1127 hrs, therefore, Nagumo ordered just the dive-bombers of the reserve force to take off, and they duly sank HMS *Cornwall* and HMS *Dorsetshire*.

Elsewhere on the 5th, *Ryujo*, operating with the Malaya Force in the Bay of Bengal, enjoyed success when its B5Ns claimed two Allied merchantmen sunk and six more damaged off the east coast of India – the Malaya Force was credited with 19 merchant ships sunk that day in total. They also set fire to fuel tanks and warehouses at Coringa and Visakhapatnam and bombed the port of Cocanada.

Shortly after 0600 hrs on 9 April Nagumo's five carriers started launching B5N2s, escorted by A6Ms, from a position 100 miles east of Trincomalee, home to the Royal Navy dockyard and the RAF airfield at China Bay. Only a handful of ships were present in harbour, as the IJN fleet had been spotted the previous night by a Catalina and Trincomalee warned of the impending attack. Author Michael Tomlinson, who was serving with

the RAF in Ceylon when the island was attacked, described the morning launch in his volume, *The Most Dangerous Moment*;

'At about 6.20 AM, when the sun's rays began to lighten up the sky behind the speeding carriers, Fuchida again took off, leading a force consisting of 91 bombers and 38 fighters, substantially the same force that had attacked Colombo on the previous Sunday. The fleet was spread over more than 15 square miles of sea, and the thunder of aero engines must have been audible for a great distance.'

There was a functioning radar station at Trincomalee, and the raid was detected before 0700 hrs, giving defending Hurricanes from No 261 Sqn plenty of time to get airborne in defence of the naval base. Flt Lt David Fulford led his dawn patrol of three fighters in the direction of the IJNAF aircraft;

'We climbed to 15,000 ft over base. I was told to fly out on a vector of 100 degrees to meet a strong plot of aircraft 30 miles from the coast. I flew behind some cumulus cloud to protect my eyes from the sun and almost immediately sighted the enemy aircraft. They were at 15,000 ft and flying due west, straight at the harbour, and I saw two formations of bombers, each comprising two vics of seven in line astern, escorted by a number of Navy Os [A6M Zero-sens]. A moment later I sighted another similar formation, about a mile behind. The escorting fighters were not in a definite formation, but spread all round the bombers.'

The Hurricanes were unable to get at the bombers prior to them attacking Trincomalee due to their strong fighter escort, Michael Tomlinson noting, 'Even with due warning, our fighters did not manage to disrupt the Japanese attack. Their bombers reached the harbour at 7.20 AM. Their disappointment at finding no fleet was great. What shipping was present, however, was attacked with their usual ruthless efficiency.' The B5N2s from *Hiryu*, *Soryu* and *Akagi* attacked first, followed by aircraft from *Zuikaku* and *Shokaku*, which targeted the airfield at China Bay. Flt Sgt George Mothersdale witnessed the latter attack from the ground;

'A beat of engines at the southwest end of the airfield was heard and a formation of six single-engined bombers had come into view, flying in a tight vic of five, with one in the box. Against the solid blue sky and bright sunshine, with their red discs prominent on their near-white undersides, they looked impressive! They came in over the ridge behind me – their altitude was only about 1500 ft – crossed the airfield on a curving track in a matter of seconds and were on their way back over the jungle northeastwards. As I stood watching it seemed unreal – they had the sky over China Bay to themselves, and the Bofors guns on the airfield had not fired.

'From behind me came the whistling sound of falling bombs. Down into the trench I crouched in the standard drill – steel helmet across the back of the head, teeth clenched – until the ear-stunning bangs of neat bomb bursts ended as abruptly as they all began.'

Three B5N2s that had targeted the harbour had indeed been hit by AA, and as they headed back in the direction of their carriers they were intercepted by Hurricanes of No 261 Sqn. A 'Kate' from *Hiryu* was duly shot down and a second example so badly damaged that its crew later ditched – they were not recovered. The final formation of 19 B5N2s from

Shokaku was attacked by two Hurricanes, which damaged seven of the bombers. Gunners in the B5N2s in turn claimed a Hurricane probably destroyed. Pilots from No 261 Sqn stated that they had shot down four 'Kates', with a fifth probably destroyed and five damaged.

Vice Admiral Nagumo's 'Val' dive-bombers made short work of the elderly carrier HMS *Hermes* and its escorts later that same day, after which his fleet departed the Indian Ocean and headed for home.

CORAL SEA CLASH

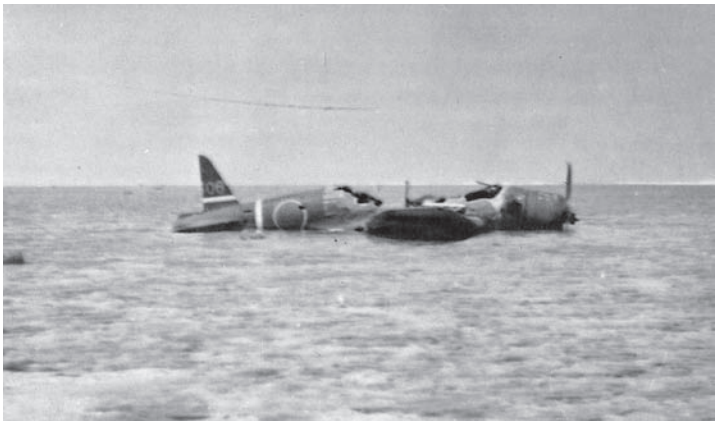
B5N2 'Kates' achieved further combat success during the next naval clash of the Pacific War, the Battle of the Coral Sea, in which the US Navy and the IJN duelled to a draw between 4 and 8 May 1942. The Imperial Japanese Army had invaded northern New Guinea in early March, capturing Lae and Salamaua. Now, the Japanese battle plan called for an amphibious assault on Port Moresby, the capital of New Guinea, and Tulagi, in the southeastern Solomon Islands. Codenamed Operation *MO*, this offensive had originally been scheduled for April with just the fleet carrier *Kaga* in support, but American carrier activity had upset Japanese plans. The new offensive would involve the light carrier *Shoho* and Mobile Force's *Zuikaku* and *Shokaku*. All three ships embarked 'Kates' within their air groups, with six on board *Shoho*, 19 on board *Shokaku* and 20 on board *Zuikaku*.

Tulagi was captured on 3 May, its occupation being supported by aircraft flying from *Shoho*. The following day Japanese troops on the island were unexpectedly attacked by 60 aircraft from the carrier *Yorktown*. All three IJN carriers were too far away to intervene, with *Zuikaku* and *Shokaku* refuelling at the time. Once word of the attack reached the fleet, Mobile Force immediately cut short its refuelling and steamed southeast for the Solomons. For the next two days the enemy fleets used their aircraft, supported by land-based aeroplanes and flying boats, to seek out each other. Finally, on 6 May, an IJNAF flying boat spotted *Lexington* and *Yorktown* and USAAF B-17s attacked *Shoho*, without success.

At 0600 hrs on the 7th, *Zuikaku* and *Shokaku* each launched six 'Kates' to search for the American task force. Rear Admiral Chuichi Hara, who was in charge of Mobile Force's air operations, directed them to the southwestern quadrant, from 180 to 270 degrees, out some 250 miles, mindful of the previous day's flying boat contact. In an effort to improve air search capabilities following the Indian Ocean campaign, Hara had been sending search aeroplanes out in pairs since the start of Operation *MO*, although still adhering to single-stage search patterns. Unfortunately, the two crews from *Shokaku* assigned to the southernmost 180-degree sector were among the least experienced. Their inept observations would cause deep trouble for Hara.

At 0722 hrs, one of the two *Shokaku* scouts flying the 180-degree search sector radioed that they had spotted an enemy force at 182 degrees, some 163 miles from base, and added at 0745 hrs that it included 'one aircraft carrier'. This was precisely what Hara had been waiting for. Between 0800 hrs and 0815 hrs, he launched a strike force that included 24 torpedo-armed 'Kates' (11 from *Zuikaku* and 13 from *Shokaku*).

Zuikaku's Lt Hikotaicho Shigekazu Shimazaki led the torpedo-bombers. At 0912 hrs the aeroplanes spotted the detected ships – the oiler USS *Neosho* (AO-23), which had been incorrectly identified as a carrier, and the destroyer USS *Sims* (DD-409). The strike force duly searched for the carriers for two hours without success, by which point the 180-degree sector scouts, having finally realised their error, radioed that their initial report of a carrier had been a mistake. Chagrined, Hara immediately recalled his strike, but not before the 'Val' dive-bombers had sunk *Sims* and disabled *Neosho*.



The wreckage of a *Shokaku*-based 'Kate', ditched during the Battle of Coral Sea, was found by US naval forces on Indispensable Reef on 9 June 1942. It was one of two sector scout B5N2s that sent erroneous sighting reports back to Mobile Force's air operations commander Rear Admiral Chuichi Hara on 3 May 1942, with disastrous results for the IJN. The 'Kates' were flown by inexperienced crews who became lost during their return to the carrier and ended up crash landing on Indispensable Reef to the east of Mobile Force (*US National Archives at College Park, MD, Still Pictures Branch*)

At 1110 hrs, shortly before the 'Vals' had begun their attack on the ships, 93 aircraft from *Yorktown* and *Lexington* had targeted the light carrier *Shoho*, devastating it with 13 bomb and seven torpedo hits that caused the ship to sink at 1135 hrs. The bulk of the carrier's air group was lost, including all six 'Kates'. Meanwhile, in a final display of their ineptitude, the two *Shokaku* 180-degree B5N2 scout crews became lost during their return to the carrier and ended up crash landing on Indispensable Reef to the east of Mobile Force.

Throughout the day, various Japanese search aeroplanes had made contact both with the US Navy carriers and an Allied Support Force (consisting of both Royal Australian Navy and US Navy cruisers and destroyers) further west. Having wasted a maximum effort strike against *Neosho* and *Sims*, however, Hara could do nothing until his aircraft were recovered. Moreover, updated position reports seemed to place the enemy carriers beyond the range of Mobile Force. Shortly after 1500 hrs, however, a report originally sent at 1407 hrs by a floatplane from the heavy cruiser *Aoba* brought unexpected news that the enemy fleet had changed course to the southeast. Calculations showed that if the enemy maintained this course and speed, he would come within striking range of IJNAF carrier aircraft by 1830 hrs. That was a long shot. It would also be 15 minutes after sunset, requiring a night landing. However, now under great pressure, with *Shoho* already lost, Hara felt compelled to take the risk. Only the most experienced and night qualified aircrews were chosen for the mission.

At 1615 hrs 12 aircraft from *Shokaku* (including six 'Kates') and 15 from *Zuikaku* (including nine 'Kates') took off and headed westward, with orders to fly a heading of 277 degrees out some 280 miles. The formation was led by 'Val' pilot Lt Cdr Kakuichi Takahashi, who did not expect to join battle for more than two hours. With action anticipated after sunset, there was no fighter escort. An earlier navigational error by *Aoba*'s scout was now about to cause tragedy.

By 1600 hrs, the US Navy carriers were actually only 190 miles west of the Mobile Force. At around 1745 hrs the Japanese passed some 30 miles south of the enemy ships in heavy overcast, quite unaware of their quarry nearby. American radar picked up the IJNAF aircraft,

however, and F4Fs from VF2 and VF42 were vectored out to intercept. Without warning, shortly before 1803 hrs, the torpedo-laden 'Kates' at the rear of the formation were ambushed by F4Fs. Five *Zuikaku* and two *Shokaku* aircraft burst into flames and fell to the Grumman fighters. The crew of one damaged *Shokaku* B5N2 attempted to return home, but ditched short of the carrier and perished. The 'Vals' up ahead, knowing they would be next, tightened formation and braced for the onslaught, but after only a brief exchange of fire the F4Fs departed, recalled by their fighter director officer aboard *Lexington* as fuel ran low.

Torpedoes now jettisoned, the surviving 'Kates' straggled back towards Mobile Force. *Zuikaku* subsequently recovered four B5N2s, with three returning to *Shokaku*. Eleven 'Vals' survived this ill-fated mission.

With his attack aeroplane strength greatly depleted and no prospect of relying on cruiser floatplanes for the next morning's search because of attrition and heavy seas, Rear Admiral Takeo Takagi (who had overall command of the Mobile Force), at Hara's suggestion, decided after midnight to begin the morning air search from a position 120 miles further north. This would allow a narrow search pattern focused southward with only a few aeroplanes, instead of 360-degree coverage. On 8 May, between 0615 hrs and 0625 hrs, three *Zuikaku* and four *Shokaku* 'Kates' took off and split up as they searched an arc 140 to 230 degrees out to a distance of 250 miles. Each aircraft flew alone, Mobile Force no longer having the luxury of flying paired searches. In contrast to the previous day, all aeroplanes were manned by experienced crews. At 0822 hrs a *Shokaku* scout flying the 200-degree search sector transmitted, 'Enemy carrier force sighted'. There followed a succession of detailed and accurate reports from the seasoned aircraft commander/observer WO Kenzo Kanno leaving no doubt that this was indeed the main enemy task force.

Between 0910 hrs and 0915 hrs, 31 aircraft (including eight 'Kates') took off from *Zuikaku*, while *Shokaku* launched 38 aeroplanes (including ten 'Kates'). Indefatigable Lt Cdr Kakuichi Takahashi once again led the total strike force of 69 aircraft southward on a heading of 196 degrees, with the carriers chasing after them at 30 knots in an effort to shorten their return flight. Meanwhile, an SBD scout from *Lexington*'s VS-2 had spotted Mobile Force and sent a contact report at 0820 hrs, prompting the US Navy carriers to launch a strike of their own.

At 1045 hrs, as it proceeded at an altitude of 3000 m, the Japanese strike force came upon Kanno's returning 'Kate'. In an act of supreme courage, with full knowledge that remaining fuel would not guarantee a safe return, Kanno's crew reversed course and guided Takahashi's strike unerringly towards the enemy. Apparently a later victim of US Navy fighters, Kanno's aeroplane did not make it back.

At 1105 hrs the American task force came into view to the southwest beneath clear skies flecked with scattered clouds and haze at lower altitudes. With Takahashi's order of 'To tsu re' ('deploy attack formation'), the 'Vals' began their climb to 5000 m while the torpedo-bombers went down to 1200 m. Approaching from the northeast, the attack order 'To, To, To, To' went out at 1110 hrs. A minute later, with *Lexington* leading and *Yorktown* trailing to the southwest, the American carriers turned to starboard onto a heading of 125 degrees, placing the oncoming Japanese on their port beams.

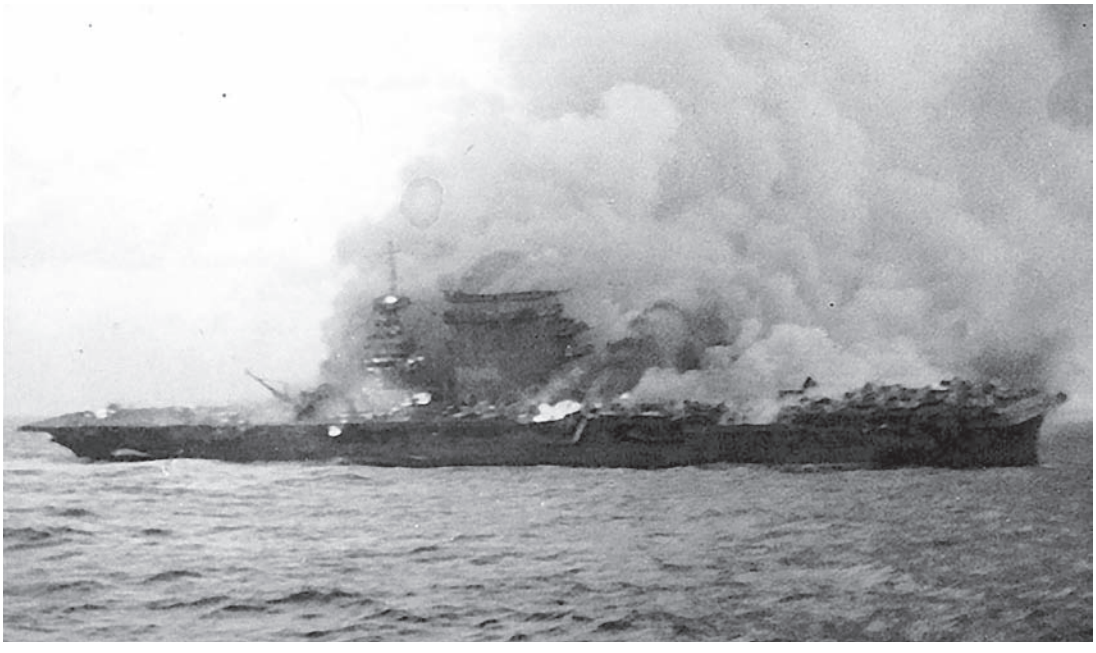
Lt Cdr Shigekazu Shimazaki led the torpedo-bombers straight for the carriers, *Shokaku*'s 'Kates' circling right to approach *Lexington*'s port bow while half of *Zuikaku*'s eight torpedo-bombers banked left and attacked it to starboard, leaving just four *Zuikaku* machines charging at *Yorktown*'s port beam. The heavy loss of B5N2s the previous evening had left too few for a full 'anvil' attack on both carriers.

Despite 20 minutes' radar warning, the American CAP was badly deployed and failed to block the Japanese attack. Only one *Zuikaku* torpedo-bomber was shot down prior to the actual assault on the carriers. Seven more (two from *Zuikaku* and five from *Shokaku*) fell to fighters and flak during their torpedo runs and the withdrawal. Lookouts on *Yorktown* spotted the four B5N2s from *Zuikaku* off the port bow, the carrier making a starboard turn to keep its stern to the torpedo-bombers. One 'Kate' was shot down by the CAP just after it had released its torpedo, while the remaining three aircraft launched their weapons at a distance of 460 m. *Yorktown* successfully combed all the torpedoes aimed at it, however, all of them missing along the carrier's port side. Another B5N2 fell to the CAP moments later.

Lexington faced a pincer attack, with three *Zuikaku* B5N2s and two *Shokaku* B5N2s curving around the port bow. The torpedo-bombers approached at an altitude of just 45 m, trying to find gaps through the CAP screen. If Capt Frederick C Sherman, commanding officer of CV-2, had turned *Lexington* into one group of aircraft to comb the tracks of their torpedoes, the other group would have had a clear shot at his ship. Sherman decided to execute a port turn in order to present the stern of the ship to the group of three *Zuikaku* aircraft. All three duly missed, and the two *Shokaku* B5N2s that launched their torpedoes from the starboard side both missed astern *Lexington* too. Six more B5Ns remained on *Lexington*'s port side, however.

Sherman ordered a hard turn to starboard to get away from the threat, but *Lexington* was slow to respond. The most northern group of two B5Ns veered off to attack the cruiser USS *Minneapolis* (CA-36), but again both torpedoes missed. Only four more B5Ns remained to deal a serious blow to *Lexington*. The Japanese aircraft closed to 640 m and then dropped their weapons from a height of 75 m. The first pair ran deep and passed under *Lexington*. However, at 1120 hrs, the first torpedo hit was taken on the forward port side, followed by another hit under the island moments later. These hits jammed the forward flightdeck elevator, buckled the port aviation gasoline tanks and flooded several compartments, forcing three boilers to be shut down. *Lexington* fought on with a 6.5-degree list to port and speed reduced to 24 knots. Takahashi's 'Vals' then targeted the American carriers.

The Japanese attack had ended by 1140 hrs. Despite the damage inflicted, both carriers appeared to be in good shape, and flight operations remained unimpaired. *Lexington*'s list was promptly corrected and its fires nearly extinguished. *Yorktown* also brought matters quickly under control. Then, at 1247 hrs, a huge explosion shook *Lexington*. Deep in the bowels of the ship, sparks from untended electric motors had ignited off fuel vapours leaking from the ruptured port gasoline stowage tanks. The resulting fires spread out of control, triggering a series of violent explosions that ultimately doomed the ship.



Lexington, with fires raging aboard due to the tremendous damage sustained – including from two torpedo hits by carrier-based 'Kates' – begins to sink on 8 May 1942 (*US Navy, Naval History and Heritage Command*)

As the survivors of the Japanese strike force returned to Mobile Force, they saw that *Shokaku* was badly damaged, billowing ominous black smoke from its bow and with its flightdeck buckled. Between 1057 hrs and 1150 hrs, the American strike groups had scored three 1000-lb bomb hits on the ship. At 1230 hrs, unable to recover aircraft, *Shokaku* directed its aeroplanes to *Zuikaku*, which was unscathed, having been hidden inside a rain squall when the attack began. Between 1310 hrs and 1430 hrs, *Zuikaku* recovered 44 aircraft. Eleven damaged aeroplanes from both carriers ditched, *Zuikaku*'s torpedo leader, Lt Cdr Shigekazu Shimazaki, coming down near the destroyer *Shiratsuyu.*

Not knowing how many aeroplanes from both carriers there were to recover, *Zuikaku*'s deck crew aggressively discarded aircraft overboard – some with only minor damage. In all, six *Zuikaku* and six *Shokaku* aeroplanes went over the side, five of them 'Kates'.

Returning strike leaders were certain they had sunk the *Saratoga*-class carrier, but were unsure about *Yorktown*. The IJN decided to report both carriers sunk, nevertheless. Later that afternoon, Mobile Force counted 24 Zero-sens, nine 'Vals' and six 'Kates' operational. An additional Zero-sen, eight 'Vals' and four 'Kates' could be made ready following repair. But Hara decided that a second strike was out of the question. Takagi radioed 'no prospect of a second strike today' at 1430 hrs and withdrew Mobile Force to the north to take stock of his remaining strength and refuel his ships. *Shokaku* had already been headed north under escort since 1220 hrs.

South Seas Force commanding officer Vice Admiral Shigeyoshi Inoue cancelled Operation *MO* later that afternoon, Port Moresby having been saved from invasion. The Battle of the Coral Sea, history's first naval action fought entirely by aircraft in which opposing surface forces never came within sight of each other, was finally over.

CHAPTER TWO

MIDWAY, THE ALEUTIANS AND THE SOLOMONS

Even before the Battle of the Coral Sea had been fought, the IJN had planned its next move in the Pacific – but only after considerable debate between the Naval General Staff and the Combined Fleet. The former wanted to blockade Australia by conducting amphibious landings in the New Hebrides and New Caledonia, whereas the Combined Fleet, under the leadership of Admiral Isoroku Yamamoto, favoured the conquest of Midway and the western Aleutians to expand the Japanese defensive perimeter. By doing this the IJN could threaten Hawaii and, more importantly, draw the Pacific Fleet's carrier force into a decisive battle that Yamamoto was confident his air groups could win. The General Staff was forced to agree with the Combined Fleet following the audacious Doolittle Raid on 18 April 1942, when 16 B-25 Mitchell bombers launched from *Hornet* on a one-way attack on Tokyo. Yamamoto was duly given permission to attack Midway (Operation *MI*) and establish observation bases in the Aleutian Islands (Operation *AL*). The attack on the latter, which was Naval General Staff's idea (Yamamoto agreed to incorporate it in Combined Fleet's plans in return for General Staff's approval

of his Midway attack) would also serve as a feint to distract American attention away from Japan's primary objective, Midway.

Yamamoto had planned for the Aleutian offensive to start the day before the attack on Midway, and he hoped the Pacific Fleet would then send its carriers northeast to defend the area. Unbeknown to him, however, the US Navy had cracked the Japanese naval code, revealing his strategy. This in turn meant that the Pacific Fleet concentrated its three carriers and supporting forces near Midway, leaving the defence of the Aleutians to a small garrison of troops supported by a modest force of USAAF fighters and bombers and three US Navy PBY squadrons.

Spearheading the IJN's Aleutians invasion force – which was commanded by Rear Admiral Kakuji Kakuta – were the light carriers *Ryujo* (with 12 Zero-sens and 18 'Kates' embarked) and *Junyo* (18 Zero-sens and 18 'Vals'). The early hours of 3 June, across the International Date Line, found the Operation *AL* task force 180 miles southwest of their target, Dutch Harbor on the Aleutian island of Unalaska. Starting at 0325 hrs, *Junyo* launched 13 Zero-sens and 15 'Vals', while *Ryujo* launched six Zero-sens (three aborted) and 14 'Kates'.

With the cloud ceiling down to 300 m, the two carrier air groups flew separately. The 'Vals' were forced to abort their mission due to the overcast conditions, but *Ryujo*'s B5N2 level-bombers managed to get through after finding clear weather over Dutch Harbor – the target area could be clearly seen beneath a cloud ceiling in excess of 3000 m. The 'Kates' attacked a radio station, tank farm, barracks at Fort Mears and moored PBYs, destroying two of the latter. During their withdrawal, the B5N2 crews spotted five destroyers in Makushin Bay, southwest of Dutch Harbor, and had a brief brush with P-40s, without loss. Rear-Admiral Kakuta now decided to go after the destroyers, sending out his second strike of the day from 1045 hrs – nine Zero-sens and 17 'Kates' from *Ryujo* and six Zero-sens and 15 'Vals' from *Junyo*. This time foul weather and freezing carburettors forced all these aeroplanes to abort.

Unsatisfied with results thus far, Kakuta was determined to raid Dutch Harbor again the next day (4 June). Starting at 1640 hrs, *Ryujo* launched six Zero-sens and nine 'Kates', while *Junyo* sent off five Zero-sens and 11 'Vals'. They eventually managed to penetrate the heavy cloud cover and reached brilliant sunshine above 2000 m. Luckily, a solitary opening in the clouds lay just above Dutch Harbor, allowing the aircraft to attack the barracks ship *Northwestern*, demolish part of a hospital and bomb oil tanks, AA positions and the naval air station hangar and pier. The carrier aeroplanes were attacked by the P-40s shortly thereafter, and although a solitary Zero-sen and four 'Vals' and their crews were lost, all the 'Kates' successfully returned to *Ryujo*.

Before launching the 4 June strike, Rear Admiral Kakuta had received shocking news of mayhem at Midway and orders from Combined Fleet (originally transmitted at 1420 hrs) to head south with all due speed and join forces with Nagumo. However, judging that three days would be needed to comply, Kakuta had decided to launch his Dutch Harbor strike first. After terminating aeroplane recovery at 2026 hrs, he dutifully headed south, but Combined Fleet's order was later cancelled, and Kakuta remained in northern waters. Operation *AL* ended successfully for the Japanese with the occupation of Kiska on 6 June and Attu the following day.

With preparations completed for Operation *MI*, Mobile Force weighed anchor and sortied from Hashirajima anchorage on 27 May. As Admiral Nagumo's carriers got underway, the Pacific Fleet's *Enterprise* and *Hornet* entered Pearl Harbor – they were joined here the following day by the damaged *Yorktown*. With clear knowledge of Japanese intentions, a sense of crisis gripped the Pacific Fleet. In a Herculean, round-the-clock effort, minimum emergency repairs needed to make *Yorktown* seaworthy and battle-ready were completed in just three days. All three carriers had left Pearl, bound for Midway, by 30 May.

To attack Midway, Admiral Yamamoto had assembled an extremely powerful fleet that was divided into a Striking Force, an Occupation Force and a Main Force. The latter was to provided distant protection and did not take part in the battle. Indeed, Occupation Force and Main Force saw very little in the way of action during *MI*. The same could not be said for Combined Fleet's four carriers within the Striking Force, however.

The US carriers rendezvoused northeast of Midway during the afternoon of 2 June, advancing westward overnight to a position 260 miles north of the atoll.

A PBY from Midway spotted ships of the Japanese invasion convoy southwest of the atoll on the morning of 3 June, and a night torpedo attack by PBYs in the early hours of the 4th damaged the oiler *Akebono Maru*. On the Japanese side, Main Force intercepted a radio message in the predawn hours indicating possible enemy carrier activity north of Midway. Mindful of maintaining radio silence, however, Yamamoto's staff declined to relay this news to Nagumo, assuming that he, 300 miles closer to Midway, would have also monitored this signal. He had not. The IJN carriers closed on Midway from the northwest, blithely unaware that their American counterparts already lay in wait.

Chronology for the Battle of Midway is particularly complex as it was literally fought across the International Dateline. In the interest of simplicity, all subsequent time references are given according to Midway Local Time, east of the Dateline.

Nagumo's carriers counted 247 aircraft operational. *Akagi*'s own air echelon possessed 18 Zero-sens, 18 'Vals' and 18 'Kates'. *Kaga*'s had 18 Zero-sens, 27 'Vals' and 18 'Kates'. *Hiryu*'s air echelon counted 18 each of these three types, while *Soryu*'s had 18 Zero-sens and 18 'Kates', but only 16 'Vals', as it had apparently transferred two to *Kaga*. In place of this pair, in partial fulfilment of recommendations following Indian Ocean operations, *Soryu* carried two of the latest D4Y1 'Judy' bombers as high-speed scouts. One was damaged in a landing mishap shortly after departing Hashirajima, however, leaving only one operational. In addition, each ship carried a trio of partially dismantled Zero-sens, 'Vals' and 'Kates' as spares.

Arrayed against them were 225 aircraft aboard the American carriers, plus a total of 127 aircraft of various types on Midway itself. Far from bringing overwhelming air power to the battle, Nagumo's airmen were outnumbered. However, these were the IJNAF's elite, the world's finest naval aviators of their day.

Starting at 0430 hrs on 4 June, the IJN carriers launched 108 aircraft against Midway, 210 miles to the southeast. Amongst this force were 18 bomb-carrying 'Kates' each from *Hiryu* and *Soryu*. With *Akagi*'s

Midway atoll is composed of two islands. Eastern Island in the foreground contained the airfield and Sand Island, across the channel, was home to a seaplane base. Midway was the lure used by Yamamoto to force the Pacific Fleet to confront the assembled might of the IJN's Combined Fleet (*US Naval Historical Center*)

Cdr Mitsuo Fuchida still recovering from an appendectomy, the overall strike was commanded by *Hiryu*'s Lt Joichi Tomonaga, who was flying the carrier's lead 'Kate'. Despite his weakened condition, Cdr Fuchida was anxious to see the first strike off in person, as he noted in his memoirs;

'At 3.00 AM (Midway local time) on 4 June 1942 I was awake in bed in *Akagi*'s wartime sickroom. The Midway operation was scheduled to start on this day. It had been a week since I was operated on, and it was only yesterday that my stitches had been taken out, but I had managed to regain some strength. The chief doctor, however, did not allow me to leave the room yet. From the flightdeck, I could hear the roaring of engines. I could not stand it anymore. It was a shame that someone other than the General Commander should take leadership in this important campaign because of appendicitis.

'I sneaked out of the sickroom, without permission from the doctor of course. However, we were already in battle mode, and all the watertight bulkheads had been closed down, so the only way out was through manholes. It required a fair amount of effort to open and close more than a dozen manhole doors that were between the sickroom and the upper deck. When I reached the upper deck I was completely exhausted. I still had another 20 m to climb up a ladder to get to the flightdeck. When I finally made it I began to feel dizzy and almost fell because of lack of blood to the brain.

'Aircrews on the flightdeck were surprised to see me and helped me to sit up. They laid me in the corner of the deck underneath the launch communications centre and put a parachute pack under my head as a pillow. Lying on the deck, I waved my hand, telling the crews, "Do your best. I am counting on you". Solely because I wanted to give them this encouragement I had forced myself up to the flightdeck.'

Together with the launch of the Midway strike, Nagumo despatched seven aircraft in a widely spaced and porous search to the east of the fleet – five cruiser floatplanes north of Midway and two 'Kates' south of the atoll. Except for the northernmost line, which was to be flown by the battleship *Haruna*'s short-ranged E8N 'Dave' seaplane, all were to fly out 300 miles and then turn left for 60 miles before heading back.

Combined Fleet had given strict orders for half of the carriers' air strength to be held in readiness to attack the enemy fleet in case it appeared. This force included 43 torpedo-armed 'Kates' (17 from *Akagi* and 26 from *Kaga*). But at 0520 hrs Nagumo announced his intent to direct this reserve force against Midway if the situation remained unchanged. Aboard the carriers, land bombs were brought up to the hangar decks in anticipation of a possible ordnance change.

At 0532 hrs ships at the front of Nagumo's formation began laying smoke after their lookouts spied an enemy flying boat – Nagumo's ships still lacked radar. At 0534 hrs and 0552 hrs, two separate PBYs from Midway each sent contact reports of two Japanese carriers. These transmissions were also picked up by the American carriers north of Midway. Midway's own aeroplanes were scrambled after its radar picked up Tomonaga's incoming strike shortly before 0600 hrs. Seven minutes later Rear Admiral Frank Fletcher, on board *Yorktown*, ordered Rear Admiral Raymond A Spruance, whose task force included *Enterprise* and *Hornet*, to 'proceed southwesterly

and attack enemy carriers as soon as definitely located', the report of only two carriers having left open the possibility of more in the area.

Having taken just 15 minutes to assemble, the Japanese strike force had moved out at 0445 hrs. Midway Atoll, with its two small islands, Sand and Eastern, came into view at 0615 hrs and Tomonaga gave the order to deploy for attack two minutes later. The 'Kates' surged forward, ready to initiate the assault, while the 'Vals' began their climb to 4000 m. The forward Zero-sen fighters, meanwhile, were now out of position, distracted by a false 'bandit' sighting and leaving their charges dangerously exposed. It was at that moment that real enemy fighters struck. US Marine Corps fighters of VMF-221 managed one clean pass, concentrating on the 'Kates', downing two from *Hiryu* and damaging several others, including puncturing the right main wing tank on Tomonaga's lead machine. Then the Zero-sens arrived, and in short order 13 F2A3s and two F4F3s were shot down and their pilots killed.

Starting at 0634 hrs, and now free from interference from enemy fighters, Tomonaga's surviving B5N2s bombed the atoll's two islands with 800 kg land bombs. One example from *Hiryu* fell to flak over Eastern Island, while two others (one each from *Hiryu* and *Soryu*) damaged earlier by enemy fighters eventually ditched with the loss of both crews.

At 0700 hrs Tomonaga transmitted a pre-arranged signal indicating that a second strike on Midway was needed. His request for a follow-up attack was subsequently criticised by Cdr Fuchida;

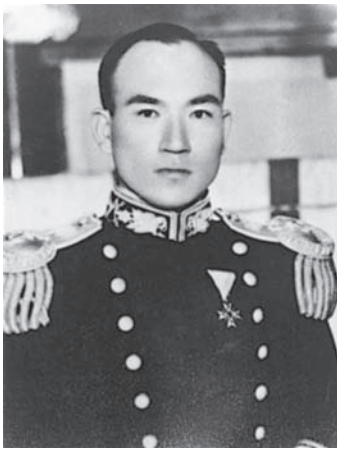
'There was not a single aircraft on the airfield at Midway, for US forces, already aware the day before of the Nagumo Task Force's presence, had evacuated the aeroplanes just ahead of the anticipated air raid at dawn. Tomonaga was extremely careless to have dropped all of his bombs without confirming the presence of enemy aeroplanes on the ground. His duty was to blow up the enemy's air power, not to dig holes on the airfield.

'Admittedly, Tomonaga was a fearless pilot with actual air combat experience in the China campaign. However, he had limited experience in over-ocean operations, and it was only before the mission to Midway that he was assigned as the *Hiryu*'s Group Aviation Commander.

'Under these circumstances he should have been perceptive enough to survey the landscape, then make the judgment that the enemy aircraft must be in the skies nearby. Midway was an isolated island in the middle of the ocean, so he should have waited for them to return and then pummelled them. Instead, after he realised that his first wave bombardment had failed to destroy the enemy's air capability, he radioed in and said, "A second attack wave is required".

'This report may have been justified, as it was indeed true that the first wave attack squadron did not achieve its objective. Nevertheless, this radio message eventually became the first stumbling block of our Midway operations.

'Upon receiving Tomonaga's report saying that a repeat attack was required, there was a commotion at the Nagumo Task Force's Command Centre. This was because they needed to wipe out the enemy base's air power before the invasion force, led by Rear Admiral Nobutake Kondo, could approach and land. Here, the primary mobilisation operation of the Nagumo Task Force was suddenly restricted, being bound by the need to support the invasion of the Midway base.



Lt Joichi Tomonaga was commander of Hiryu's air group at Midway. Flying a 'Kate', he played an important part in the battle as the leader of the Japanese strike on Midway atoll on the morning of 4 June and later as the commander of the second strike on *Yorktown*, which materially contributed to the sinking of the American carrier. Five B5N2s fell to defending F4Fs during the attack on *Yorktown*, including Tomonaga's. According to Fuchida's memoirs, 'Lt Tomonaga crashed onto the enemy carrier on his third bombing attack, crippling her ability to function'. US Navy records, however, indicate that Tomonaga probably crashed into the ocean and did not strike the carrier (*US Naval Historical Center*)

'Responding to this urgent situation, Nagumo decided to divert the second wave attack squadron that was standing by for the possible appearance of the enemy task force. However, the second wave attack squadron was equipped with anti-ship attack weapons. A base attack cannot be made with torpedoes. The Command Centre quickly issued an order to the second wave attack squadron to change their weapons to bombs for a land attack. I thought that we should not do this. However, I did not have the power to stop this action, and I was lying on the deck in a hospital gown. The *Akagi* was in utter confusion as the aeroplanes that had been standing by on the flightdeck were lowered down by elevator to the hangars below, where their torpedoes were replaced by land bombs.'

The receipt of Tomonaga's pre-arranged signal at 0700 hrs was also about the time that the Striking Force's search aeroplanes would have reached the end of their outward leg, assuming that they were on schedule – unbeknownst to Nagumo, a number of them were not due to problems delaying their launching from various cruisers. Nagumo waited 15 minutes following Tomonaga's message, but with no word from his search aeroplanes, at 0715 hrs, he ordered the ordnance change to prepare his reserve force for a second strike on Midway. Exchanging torpedoes for land bombs on the 'Kates' involved the replacement of attachment racks. This was a laborious process that could easily consume more than two hours even under ideal conditions.

Influencing Nagumo in his decision had been the arrival at 0710 hrs of the first attacks from Midway. No carriers were hit by the six TBF-1s and four USAAF B-26s that targeted the ships with torpedoes. Having survived this strike unscathed, Nagumo now assumed that his task force was no longer in immediate danger of attack.

Meanwhile, shortly after 0700 hrs, Spruance had begun launching his strike against the still oblivious Nagumo, 175 miles distant, bearing 245 degrees to the southwest. Had *Chikuma* 'No 1' – the E13A 'Jake' floatplane flying the 77-degree search line – been more alert, it should have spotted Fletcher's task force by 0630 hrs. But, apparently hampered by cloud cover, it had seen nothing. Then, at 0728 hrs, *Tone* 'No 4' sent a vaguely worded contact report of 'what appears to be ten enemy ships' bearing ten degrees, 240 miles north of Midway. The message was received on *Akagi*'s bridge by 0740 hrs. The floatplane had stumbled upon Spruance's task force.

Alarmed by the report of US carriers possibly nearby, Nagumo ordered 'Prepare to attack enemy ships. Torpedo aeroplanes to retain torpedoes' at 0745 hrs. To *Tone* 'No 4' he shot back a message in the clear at 0747 hrs to 'ascertain ship type and maintain contact'. Mindful of Hara's mistake at Coral Sea in going after *Neosho* and *Sims*, Nagumo wanted confirmation.

The 'Kate's' Type 91 Mod 3 Air Torpedo was a highly effective weapon fitted with a 235 kg warhead and was capable of travelling at 42 knots for up to 2000 yards. The importance of the combination of the B5N2 and its reliable and effective torpedo cannot be understated. Both at Coral Sea and Midway, this combination gave IJNAF air groups an effective ship-killing power not possessed by American carriers of the day (*Naval History and Heritage Command*)

Shortly after 0800 hrs, aeroplanes from Nagumo's Midway strike began to appear back over their carriers, only to find it under attack by a wave of US Marine Corps SBD

Dauntless dive-bombers from the island. While the 'Kates' and most of the 'Vals' circled in the distance, the escort Zero-sens joined the CAP fighters in battle. As with the first attackers from Midway, none of the aircraft in this wave achieved any hits on the carriers. The SBDs were followed shortly thereafter by 15 high-flying B-17s that dropped bombs on *Akagi*, *Hiryu* and *Soryu*. Although none of the Flying Fortresses were lost, they too failed to score any hits.

At 0820 hrs, following various transmissions, *Tone* 'No 4' finally radioed, 'enemy is accompanied by what appears to be one carrier to the rear'. *Soryu*'s new 'Judy' carrier reconnaissance aircraft departed at 0830 hrs to amplify the contact.

With the carriers heeling dangerously as they took evasive action against Midway's bombers, the feverish activity in the hangar decks of *Akagi* and *Kaga* to revert to torpedoes was far from complete. But the dive-bombers aboard *Hiryu* and *Soryu* were ready to go. Rear Admiral Tamon Yamaguchi, commander of the Second Carrier Division (which controlled *Soryu* and *Hiryu*), sent a strongly worded signal to *Akagi*: 'Deem advisable we launch strike immediately with ordnance as is'. But Nagumo did not respond. At the urging of senior air staff officer Cdr Minoru Genda, the decision was made to complete rearming of the 'Kates' and launch a coordinated, mass attack according to doctrine. By now, most of the Zero-sens that had been allotted to escort the reserve force had been sent aloft to augment the CAP.

Furthermore, the returning aeroplanes of the Midway strike now circled impatiently, low on fuel, some damaged or with wounded aboard. The location of the enemy ships as reported by *Tone* 'No 4' was some 200 miles away. Confident that there was still time, Genda proposed to recover the Midway strike first. Its Zero-sens could then be used to escort the upcoming strike after being rearmed and refuelled. Nagumo and the rest of the staff concurred. However, the reported position of the American task force was in error. By now it was only 150 miles away, and its strike aeroplanes were already on their way.

The attacks from Midway finally abated at around 0840 hrs. A brief window of time now opened for Nagumo's carriers to spot and at least begin launching their strike before the American carrier aeroplanes arrived. However, that would force many from their own Midway strike to ditch while awaiting recovery – not a rational option. Landings began immediately. Still, three B5N2s (one from *Hiryu* and two from *Soryu*) ditched, although their crews were saved. Recovery of the Midway strike was largely completed by 0918 hrs, just as the first US carrier aeroplanes appeared. The precious window of time now closed irrevocably.

As is well known, the first American carrier aeroplanes to arrive over the Japanese fleet were 15 TBDs from *Hornet*. By 0935 hrs all had been shot down while attacking *Soryu* without scoring a hit, leaving a sole survivor swimming in the water. The rest of *Hornet*'s squadrons, apparently searching for additional Japanese carriers, had headed west and missed the battle entirely, losing ten F4Fs and three SBDs in ditchings. Next, at 0940 hrs, came 14 TBDs from *Enterprise*. These attacked *Kaga*, but scored no hits, losing ten. Then, shortly after 1000 hrs, the dive-bombers from *Enterprise* arrived belatedly from the southwest. Coincidentally, the *Yorktown* squadrons approached from the southeast. They were the only

US units to maintain group integrity. This finally gave the American flyers a chance to make a coordinated attack.

Aboard Nagumo's carriers, activity became even more feverish as the aeroplanes just back from the Midway strike were prepared as a second wave against the US task force. Rearming of the first wave aboard *Akagi* and *Kaga* was nearing completion, the launch having originally been set for 1030 hrs. The waves of incoming enemy torpedo-bombers had caused great delay, however, with the flightdecks being kept busy cycling CAP fighters. The hangar decks were packed with fully armed and fuelled aeroplanes waiting for a 'lull in the storm' to spot and launch. Off-loaded ordnance lay scattered about the hangars, with no time to stow it properly below.

Lookouts spotted *Yorktown*'s 12 TBDs shortly after 1000 hrs, but apparently missed the higher flying SBDs and F4Fs. Nor did they see the approach of *Enterprise*'s SBDs and TBDs from the southwest. The attention of the ships' crew was also drawn to this new fight brewing at low altitude. Seven TBDs were 'splashed' before they could launch torpedoes. Then disaster struck Nagumo. Exploiting the confusion caused by the torpedo-bombers' ill-fated attack, the SBDs had approached their targets unseen until they were nearly overhead. Lookouts saw them at the last minute, just as they went into their dives. AA batteries, still trained low against the torpedo attack, frantically cranked upward and began firing. But it was too late.

Cdr Fuchida, having remained on the flightdeck following the first launch of the day from *Akagi*, had been an increasingly frustrated witness to the indecision that had effectively sealed the fate of the Striking Force during the morning of 4 June;

'Once the location of the enemy task force had at last been pinpointed, the carriers had to be annihilated without delay. From ancient times, military strategy has required speed before quality. I thought that we must immediately launch the second-wave ['Kate'] attack squadron. They carried land bombs, but land bombs can be powerful enough to penetrate the flightdecks of enemy carriers. This would cripple their landing and takeoff function. We could take time to deliver the fatal blow later.

'I was impatient. However, the Command Centre preferred quality over speed. In particular, Admiral Nagumo was emotionally disinclined to launch the attack squadron unaccompanied by the air supremacy unit. We called it "flying naked", and we had just witnessed the disaster of many enemy torpedo-bombers that were flying naked all being shot down by our "Zero" fighters. Because of this, Nagumo did not feel like sending the second wave attack squadron unescorted by our fighters. However, the fighters currently were all in the air counterattacking the enemy, and they had to land and refuel before the second wave could be launched.

'In this situation Nagumo issued an order to prepare to receive the returning fighters. They would, of course, be received based on fast landing procedures, but this would still take more than 30 minutes. In the meantime the flightdeck had to be cleared. This meant that the attack squadron lined up on the flightdeck had to be lowered to the hangar deck. Once the attack aeroplanes had been lowered, the order was given to convert to torpedoes while the topside fighters were being refuelled.

'Inside the hangar area there was utter confusion, as the crews had to remove the land bombs they had just installed and replace them once

again with torpedoes. The maintenance and munitions crews desperately completed their efforts without a single word of complaint. Thus, the operation went smoothly, and the air supremacy fighters and torpedo bombers were lined up on the flightdeck. Now everything was ready to launch the attack on the enemy carriers. The *Akagi* was sailing against the wind at full speed.

'"Start launching!" The first fighter in the front row took off. In another five minutes the launching of all the other aeroplanes would be completed. This is what was called the fateful five minutes of the Battle of Midway [Fuchida's "fateful five minutes" has been described as a myth by modern historians, in particular Jonathan Parshall and Anthony Tully, authors of *Shattered Sword*, as they state that the flightdecks of the Japanese carriers were nowhere near ready to launch when they were hit]. Just as all of this was taking place there was an attack by an enemy dive-bombing squadron. The look-out screamed, "Incoming enemy aircraft!"

'As I looked up from the deck where I was lying, a formation of nine enemy dive-bombers started to descend from the scattered clouds. We shot deafening rounds from our AA guns, but they did not hit their targets. As soon as the first enemy aeroplane raised its nose and produced a rasping sound, something black came drifting down. It was a bomb. For a veteran pilot like myself it is not too difficult to determine whether the released bomb will hit or not. I saw that it would not hit us, and, sure enough, it fell into the sea on the starboard side of the *Akagi*.

'Smoke rose from the explosion that followed. However, the pilot of the second aeroplane measured the shortfall and made adjustments. He raised the aeroplane's nose and, with a rasping sound, dropped his bombs. Again I saw that even though it would be much nearer it would not hit us. As I expected, the bomb fell, almost touching the starboard side of the *Akagi*, but it only ended up scaring the AA gunners and ship crews in charge of takeoff and landing operations.

'However, the crucial aeroplane was the third one, because its pilot could make adjustments based on the two previous misses. The aeroplane raised its nose, and the bomb that was released was floating down as though aimed straight at my navel. "This can't be happening", I thought, and I held my head and lay on my stomach. The bomb hit the centre of the flightdeck with a big blast, very close to where I was. I was lifted by the explosion and thrown against the flightdeck at the front edge of the bridge. I could not stand up, no matter how hard I tried. Both of my legs were broken. One of the breaks, my right heel bone, was a simple fracture, but my left leg had suffered a complex fracture and the bones were separated in three areas. I was no longer able to stand as my ankle was twisted.

'The enemy bomb was not powerful enough to sink the *Akagi*, but it started a fire. Our aeroplanes that had been readying for takeoff burst into flames. They started to explode, one after another, and the explosions rocked the *Akagi*. It felt like an act of suicide. I became engulfed in the fire, and an emergency-crew member rescued me from the flames, draped me over his shoulder and carried me down to the anchor deck. There, I was wrapped up and sent by a motorboat to the [light cruiser] *Nagara*.'

Aside from hitting *Akagi*, SBDs from *Enterprise* also struck *Kaga*, while those from *Yorktown* hit *Soryu*. In the space of five minutes, between

1023 hrs and 1028 hrs, *Kaga* and *Soryu* became blazing infernos as exploding fuel and ordnance from aeroplanes in the hangars added to the carnage. *Akagi*'s fires also soon spiralled out of control. The Japanese CAP and AA batteries managed to down no more than two or three SBDs, while one or two more ditched soon after bombing.

Now only *Hiryu* remained. Nagumo and his staff departed the burning *Akagi* at 1048 hrs as Rear Admiral Hiroaki Abe of 8th Sentai assumed temporary command of the fleet. At 1050 hrs, when Abe ordered Rear Admiral Yamaguchi to attack the enemy, the latter had already decided to do so on his own initiative. Eighteen 'Vals' and six Zero-sens departed at 1100 hrs, Lt Tomonaga's surviving 'Kates', just back from Midway, remaining in the hangar deck as crews frantically prepared them for a follow-up strike against the American ships. Upon transferring his flag to the cruiser *Nagara*, Vice Admiral Nagumo would signal his resumption of command at 1130 hrs.

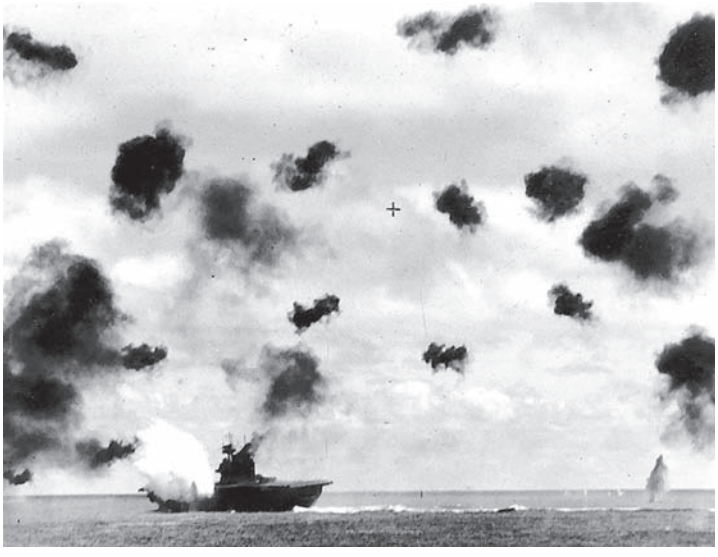
After fighting their way through the F4F CAP, eight 'Vals' scored three hits on *Yorktown*. They had delivered a deadly blow, but at a high price – only five dive-bombers and a solitary Zero-sen made it back to *Hiryu*. By then, the carrier's second strike, consisting of ten torpedo-armed 'Kates' and six Zero-sens, had already departed, the naval aviators having taken off at 1331 hrs with orders to attack a 'new' carrier spotted by *Chikuma* 'No 5' at 1110 hrs. Lt Joichi Tomonaga led the strike, still flying his aeroplane with its holed wing tank empty. With insufficient fuel in his 'Kate' to return to his carrier after the strike, he knew that this would be a one-way mission.

By 1400 hrs repairs aboard *Yorktown* were going well. Following the dive-bombing attack the ship had gone dead in the water, but the fires were quickly extinguished or contained and the carrier began to move again under its own power as three boilers came back online. At 1430 hrs Tomonaga's formation spotted *Yorktown*. Although the location was further north than expected, the carrier showed no outward signs of distress. Mistaking it for the newly discovered second carrier, Tomonaga attacked. Five B5N2s fell to defending F4Fs, including Tomonaga's. According to Fuchida's memoirs, 'Lt Tomonaga crashed onto the enemy carrier on his third bombing attack, crippling her ability to function'. US Navy records, however, indicate that Tomonaga probably crashed in the ocean and did not strike the carrier.

Nevertheless, by 1444 hrs, the remaining 'Kates' had put two torpedoes into *Yorktown*'s port side amidships while the escorting Zero-sens did their best to fend off the F4F CAP. *Yorktown* lost all power and developed a list to port that eventually reached almost 30 degrees, with the rudder jammed 15 degrees to port. Fifteen minutes after the torpedo attack, *Yorktown*'s captain decided to abandon ship. Five 'Kates' and four Zero-sens survived the battle and returned to *Hiryu*, the B5N2s and two of the fighters landing by 1545 hrs.

Tamon Yamaguchi had, meanwhile, been busy preparing a third strike with whatever aeroplanes he could muster. Seeing the heavy losses suffered by his first strike, he decided to postpone the third strike to a dusk attack. He hurried repairs to damaged aircraft and ordered food and rest for his exhausted flyers. At 1630 hrs the third strike launch was set for 1800 hrs, with five 'Vals', four 'Kates' and ten Zero-sens.

Then, shortly before 1645 hrs, CAP Zero-sens spotted incoming SBDs. Without effective voice radios in their cockpits, no word reached *Hiryu*. Lookouts in the fleet failed to see the enemy aeroplanes as they approached from the west, out of the sun. Finally, at 1701 hrs, the SBDs were suddenly discovered overhead, about to go into their dives. Sixteen minutes earlier, two SBD scouts from *Yorktown* had located *Hiryu*. *Enterprise* had launched 25 SBDs (including 14 refugees from *Yorktown*) by 1542 hrs, with *Hornet* following with 16 more at 1604 hrs. Minus three aborts, 38 SBDs had gone after the remaining Japanese carrier and its attendants.



Yorktown sustains a second torpedo hit from one of *Hiryu*'s 'Kates' during the Battle of Midway on 4 June 1942. Ten B5N2s targeted the already bomb-damaged carrier, which was later torpedoed and sunk by the Japanese submarine *I-168* (*US National Archives at College Park, MD, Still Pictures Branch*)

In a desperate bid to save their sole surviving carrier, defending Zero-sens followed the SBDs down in the dive and destroyed three of them. However, at 1703 hrs, the remaining Dauntlesses plastered *Hiryu* with four 1000-lb bombs forward of the bridge, demolishing the forward flightdeck and hurling part of the forward elevator back against the bridge.

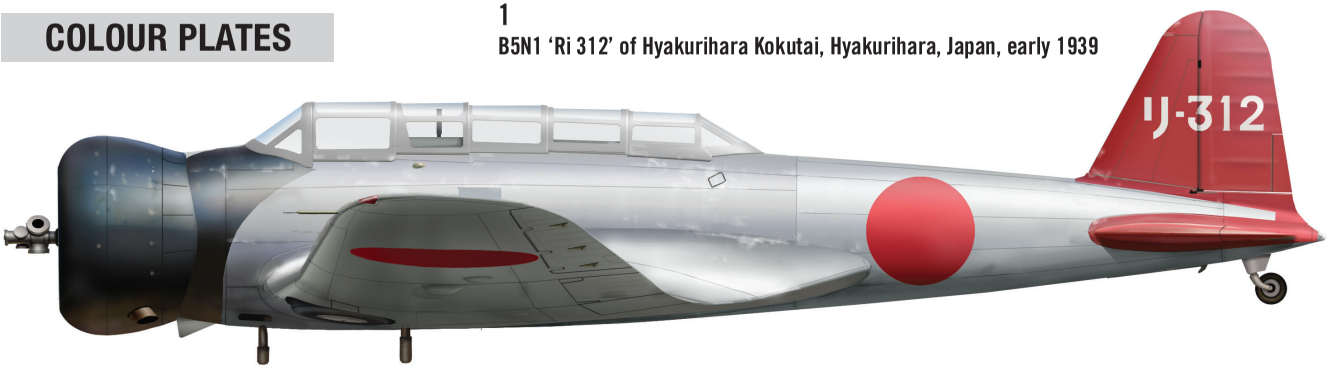
Despite all four carriers now having been knocked out, both Nagumo and Yamamoto were initially determined to continue the battle with a surface action against the Americans. By 2130 hrs Nagumo realised this was impractical, and Yamamoto finally relented around midnight. The capture of Midway was formally cancelled at 0255 hrs on 5 June.

Desperate attempts to fight the fires aboard *Kaga*, *Soryu* and *Akagi* had continued all day on the 4th, but to no avail. *Soryu* was scuttled by three torpedoes from the destroyer *Isokaze*, sinking at 1913 hrs. *Kaga*'s fierce fires had consumed it almost down to the waterline by the time the destroyer *Hagikaze* put the ship out of its misery at 1925 hrs. *Akagi* continued to linger, but was finally ordered scuttled the next morning, sinking by 0520 hrs on the 5th. Firefighting on *Hiryu* continued throughout the night, but 'abandon ship' was ordered at 0315 hrs on the 5th. At 0510 hrs the destroyer *Makigumo* sent one torpedo into the carrier's starboard side and departed. *Hiryu*, however, remained afloat, finally sinking well after sunrise at around 0915 hrs.

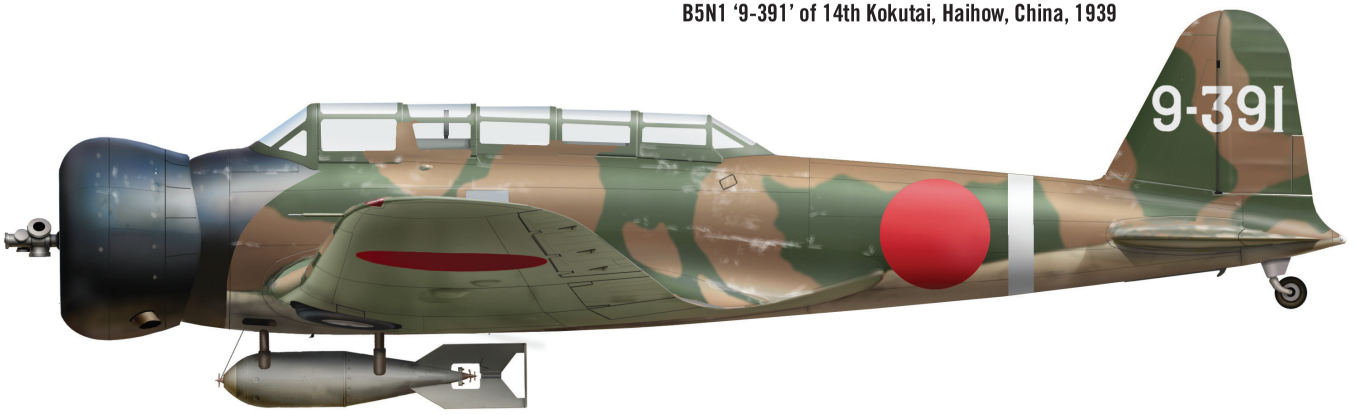
Surprisingly, only 29 carrier airmen had perished aboard ship or in the water. Although the IJN had lost more than 3000 men in the Battle of Midway, only 121 were airmen. 'Many of our aircrews survived on the *Akagi*, *Kaga* and *Soryu*, as the ships were hit immediately before the aeroplanes were launched', explained Cdr Fuchida. 'My fighting spirit had not been dampened, and I thought that we could regain our battle momentum as these veteran pilots had survived, despite the loss of four carriers.' The Americans, by contrast, had lost 188 naval aviators. But the huge loss of highly trained mechanics, armourers and flightdeck crew, not to mention four fleet carriers and their sailors, was a devastating blow from which the IJN would never recover. (*Text continues on page 59.*)

COLOUR PLATES

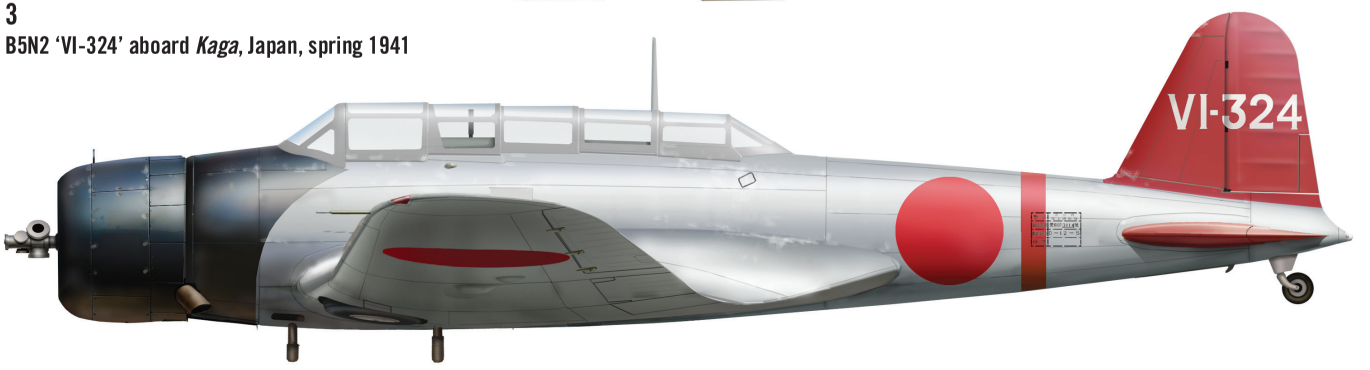
1
B5N1 'Ri 312' of Hyakurihara Kokutai, Hyakurihara, Japan, early 1939



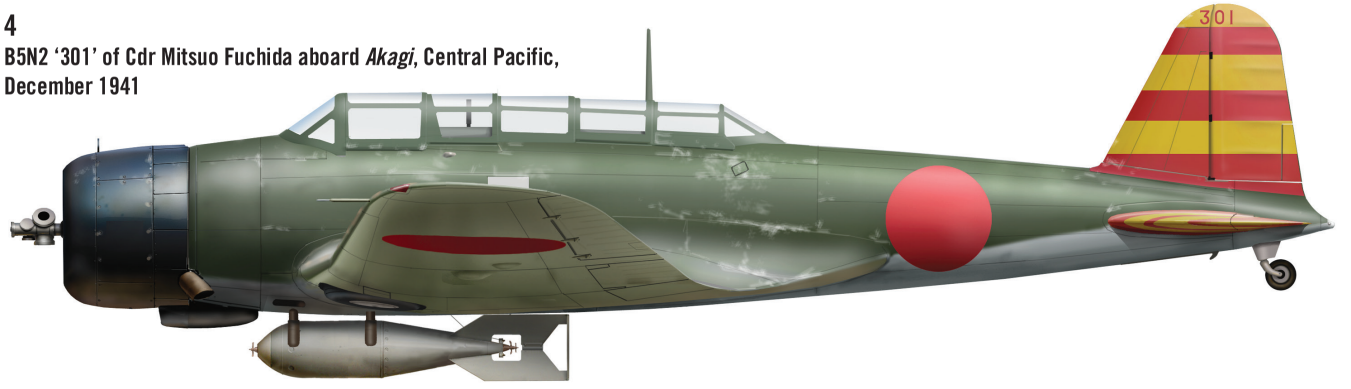
2
B5N1 '9-391' of 14th Kokutai, Haihow, China, 1939



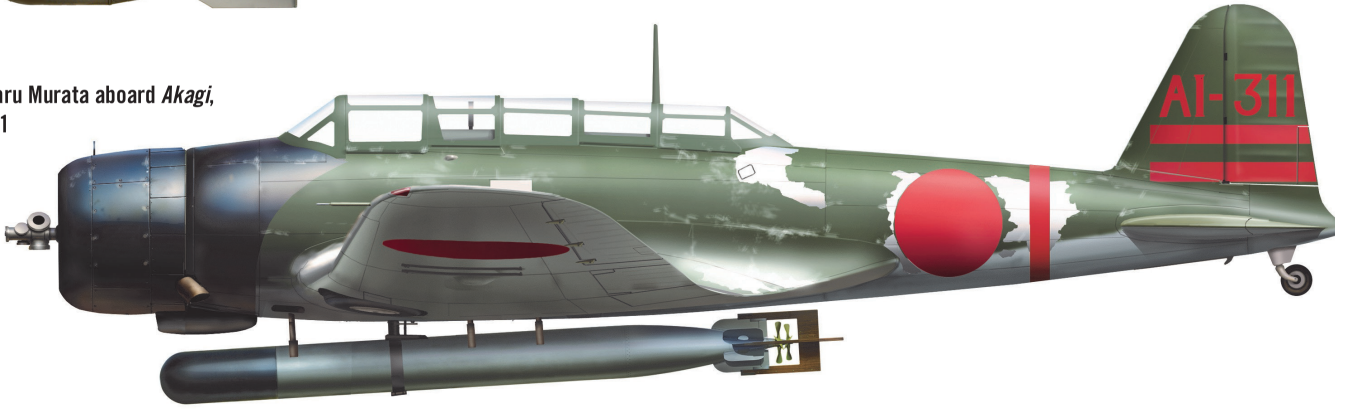
3
B5N2 'VI-324' aboard *Kaga*, Japan, spring 1941



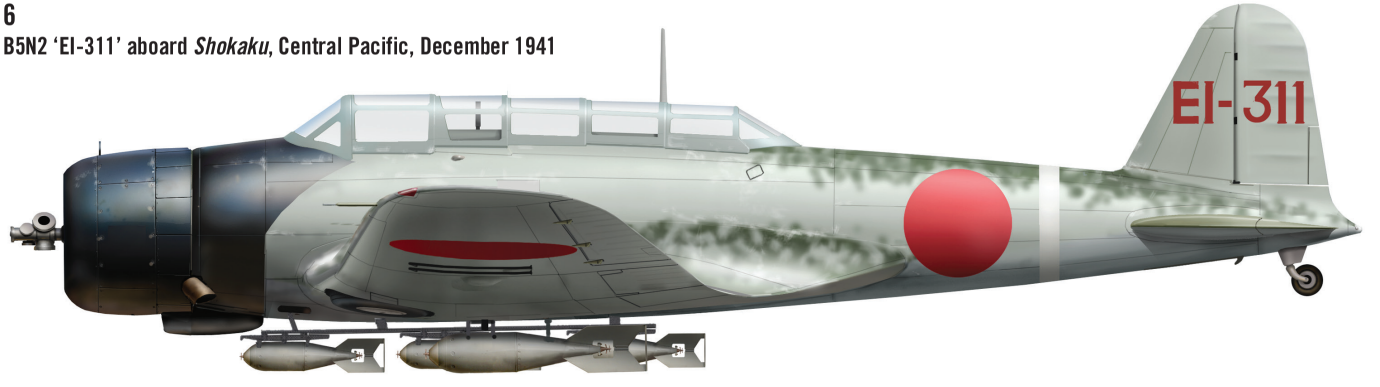
4
B5N2 '301' of Cdr Mitsuo Fuchida aboard *Akagi*, Central Pacific, December 1941



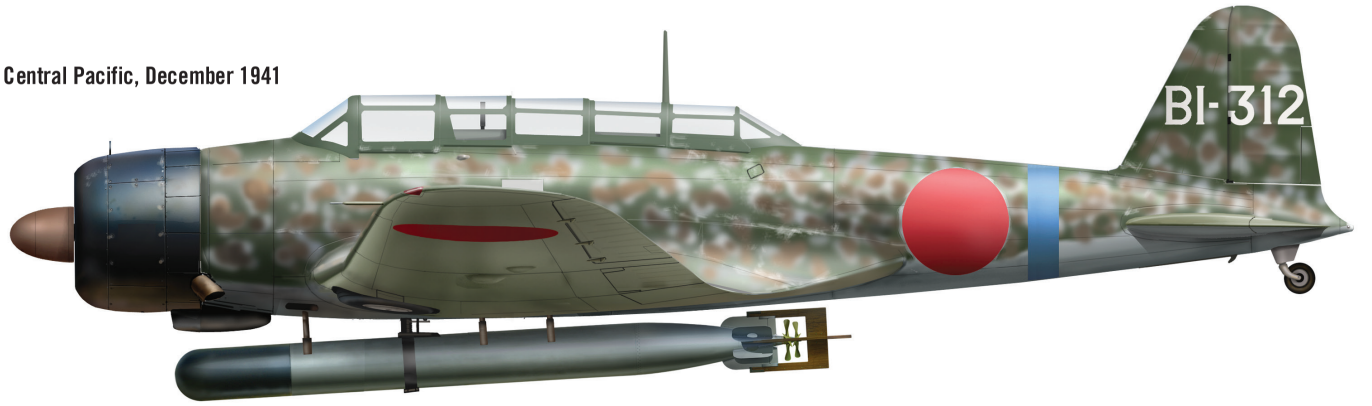
5
B5N2 'AI-311' of Lt Cdr Shigeharu Murata aboard *Akagi*, Central Pacific, December 1941



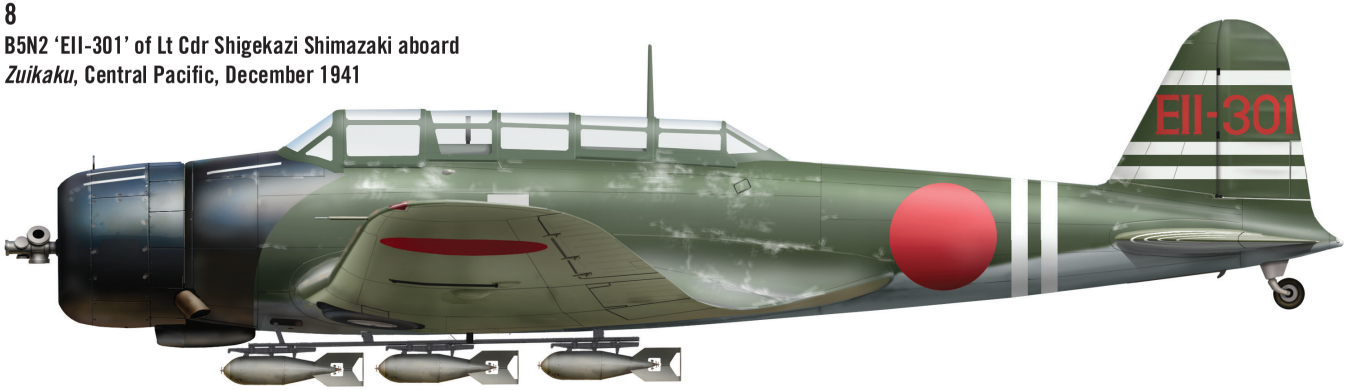
6
B5N2 'EI-311' aboard *Shokaku*, Central Pacific, December 1941



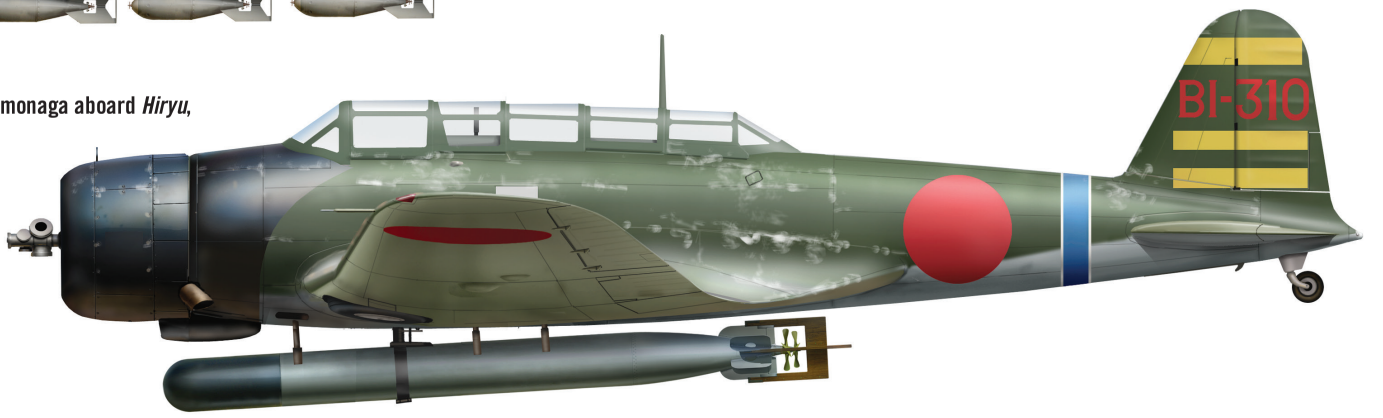
7
B5N2 'BI-312' aboard *Soryu*, Central Pacific, December 1941



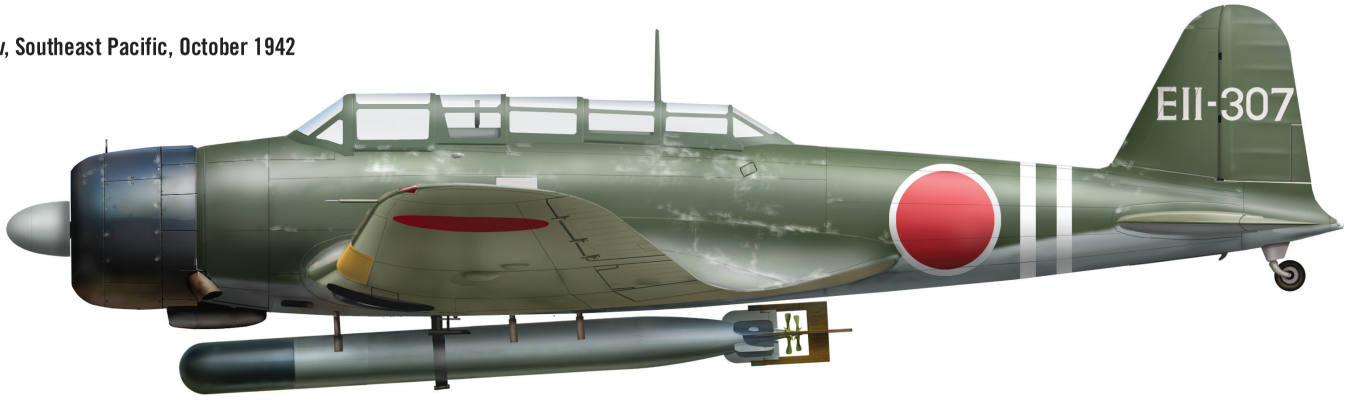
8
B5N2 'EII-301' of Lt Cdr Shigekazi Shimazaki aboard *Zuikaku*, Central Pacific, December 1941



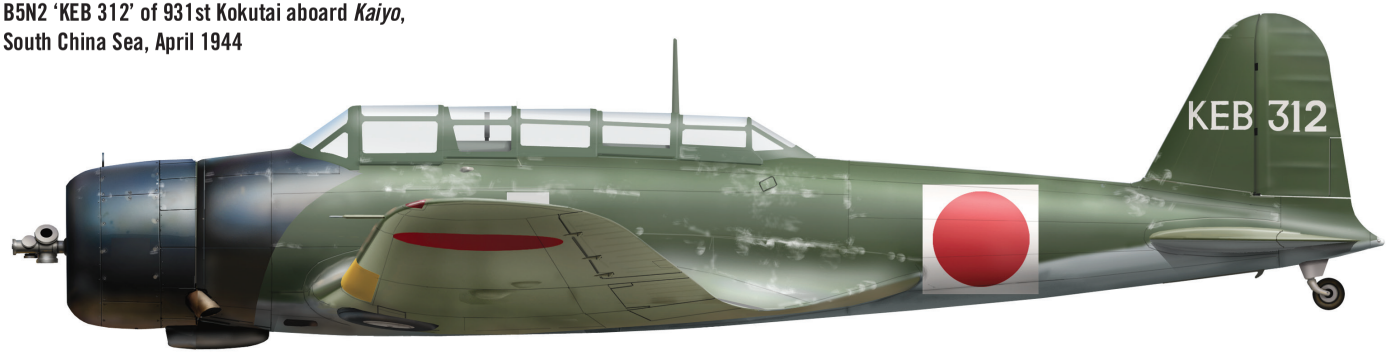
9
B5N2 'BI-310' of Lt Joichi Tomonaga aboard *Hiryu*, Central Pacific, June 1942



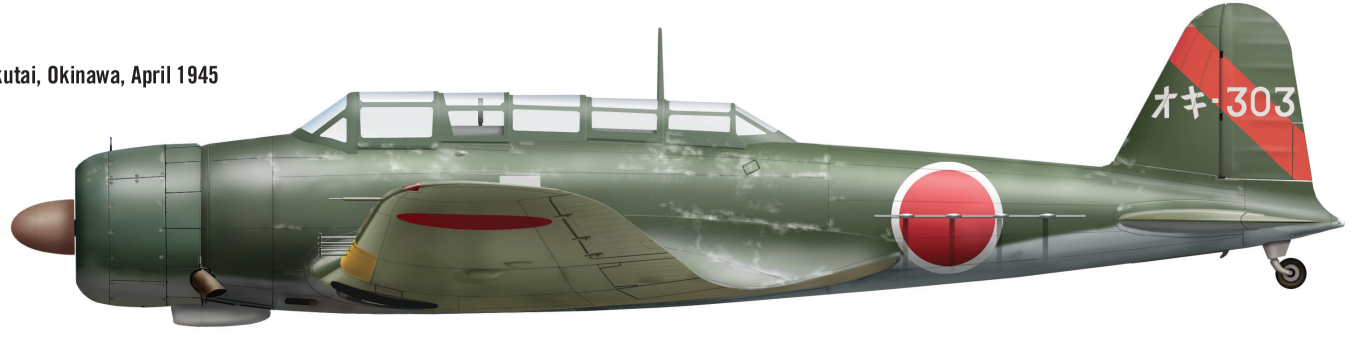
10
B5N2 'EII-307' aboard *Zuikaku*, Southeast Pacific, October 1942

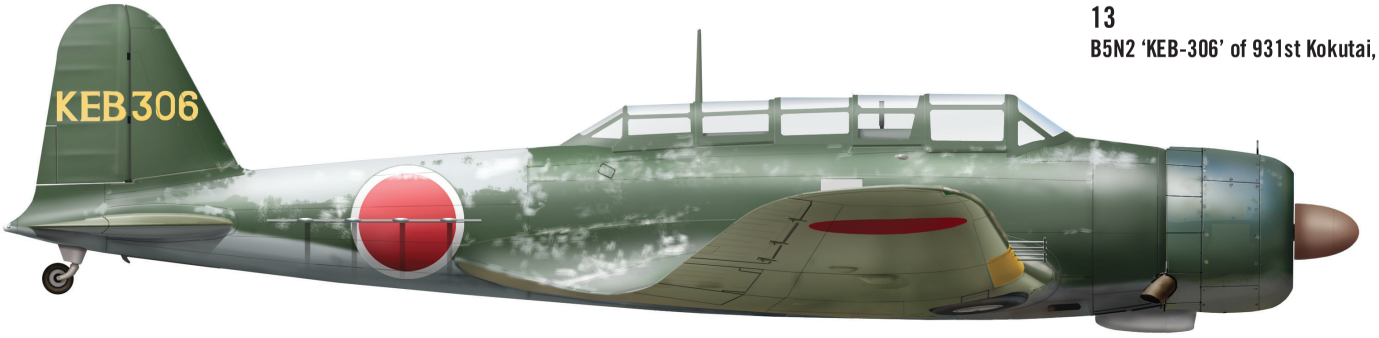


11
B5N2 'KEB 312' of 931st Kokutai aboard *Kaiyo*, South China Sea, April 1944

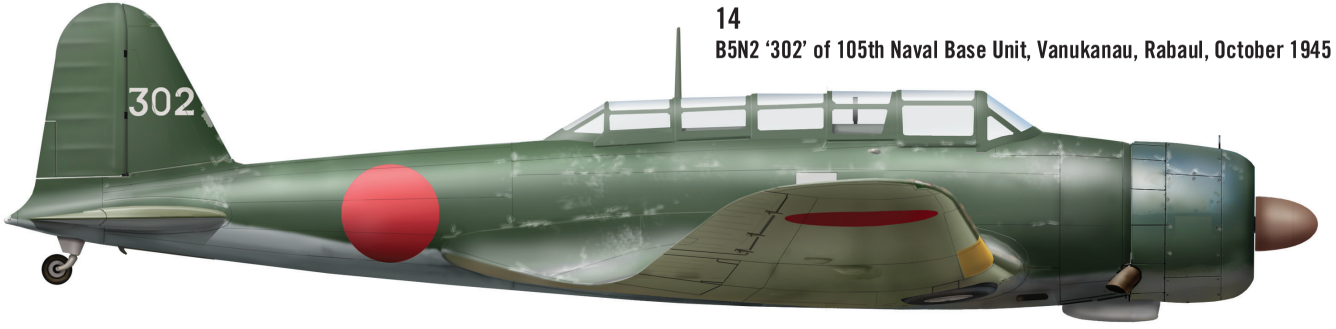


12
B5N2 '303' of 3rd Okazaki Kokutai, Okinawa, April 1945

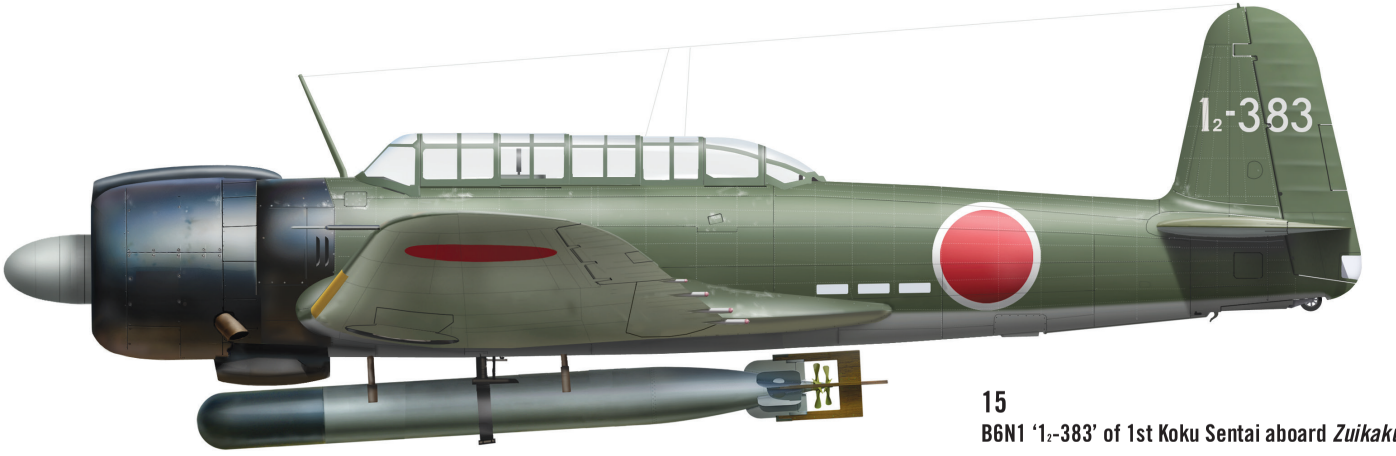




13
B5N2 'KEB-306' of 931st Kokutai, Saipan, June 1944

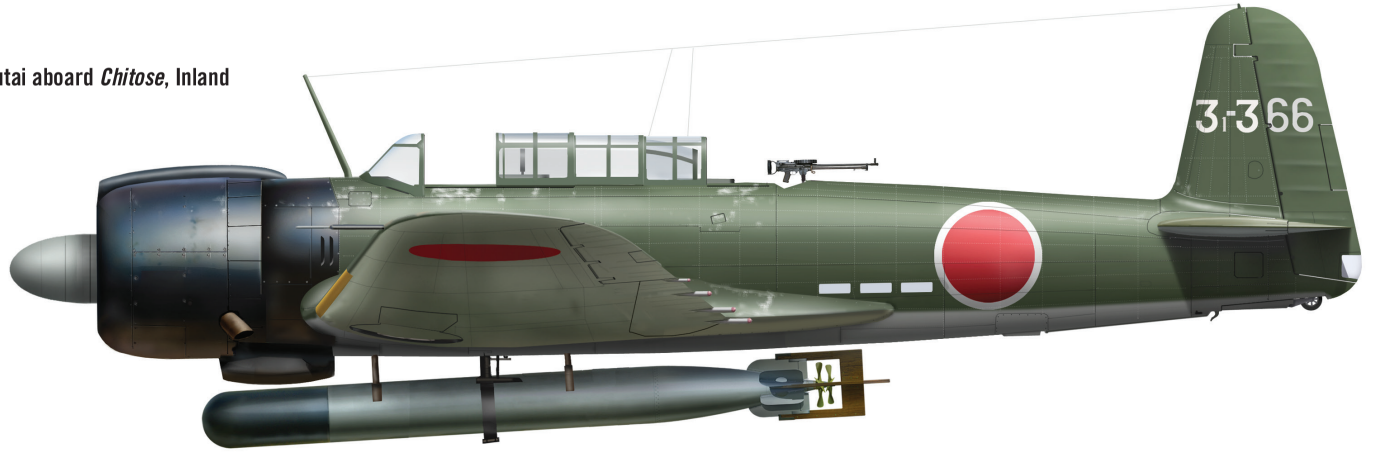


14
B5N2 '302' of 105th Naval Base Unit, Vanukanau, Rabaul, October 1945

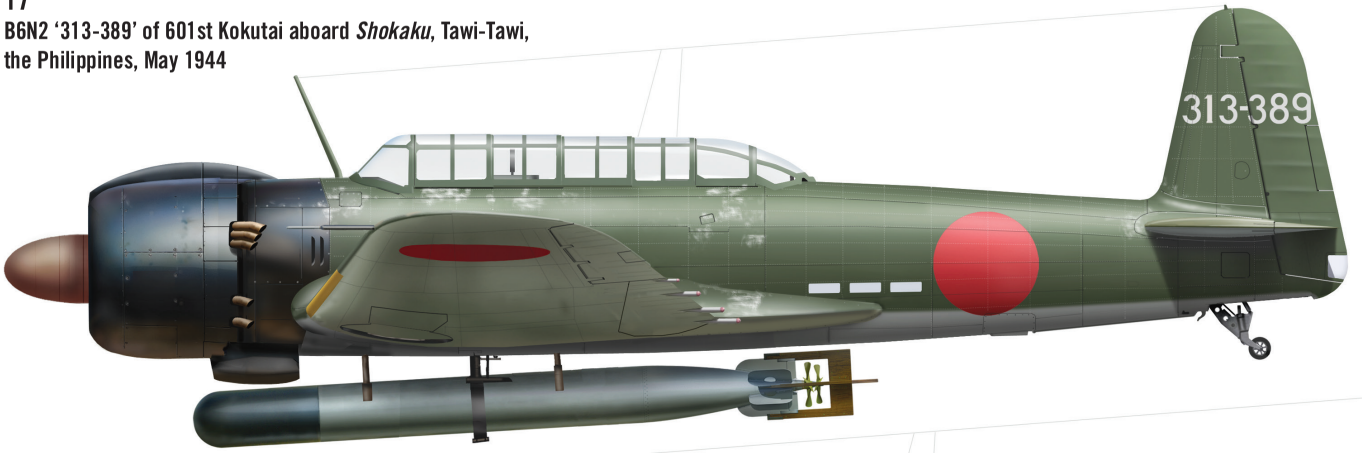


15
B6N1 '1_2-383' of 1st Koku Sentai aboard *Zuikaku*, spring 1944

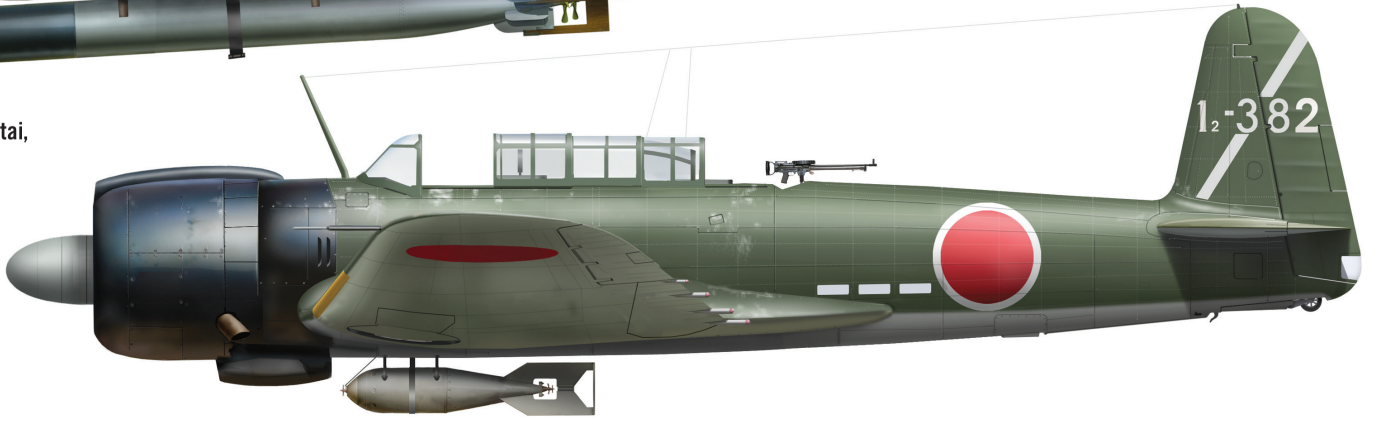
16
B6N1 '3_1-366' of 653rd Kokutai aboard *Chitose*, Inland Sea, Japan, April 1944



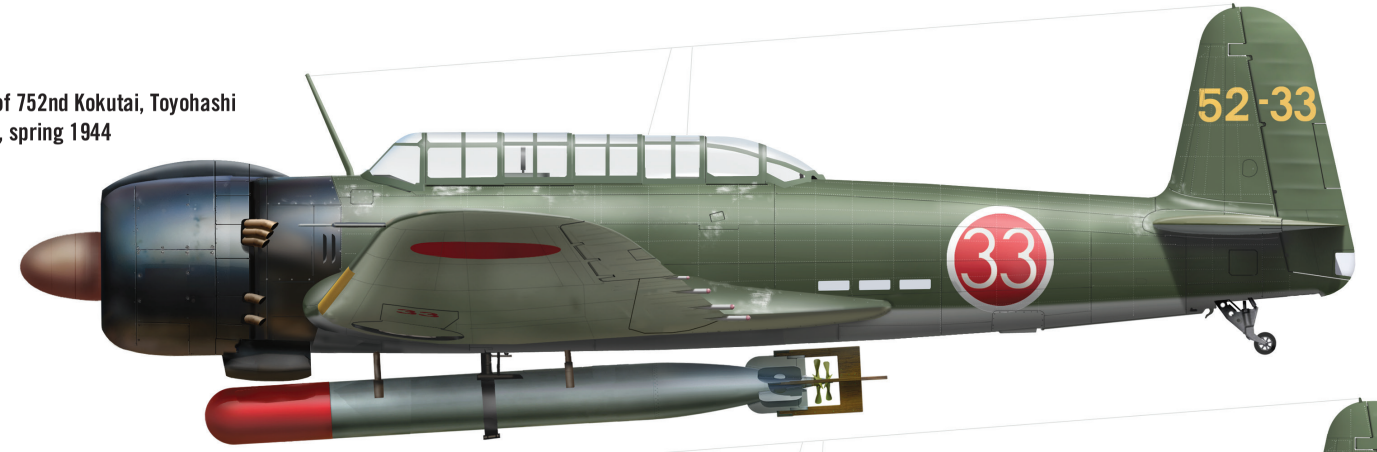
17
B6N2 '313-389' of 601st Kokutai aboard *Shokaku*, Tawi-Tawi, the Philippines, May 1944



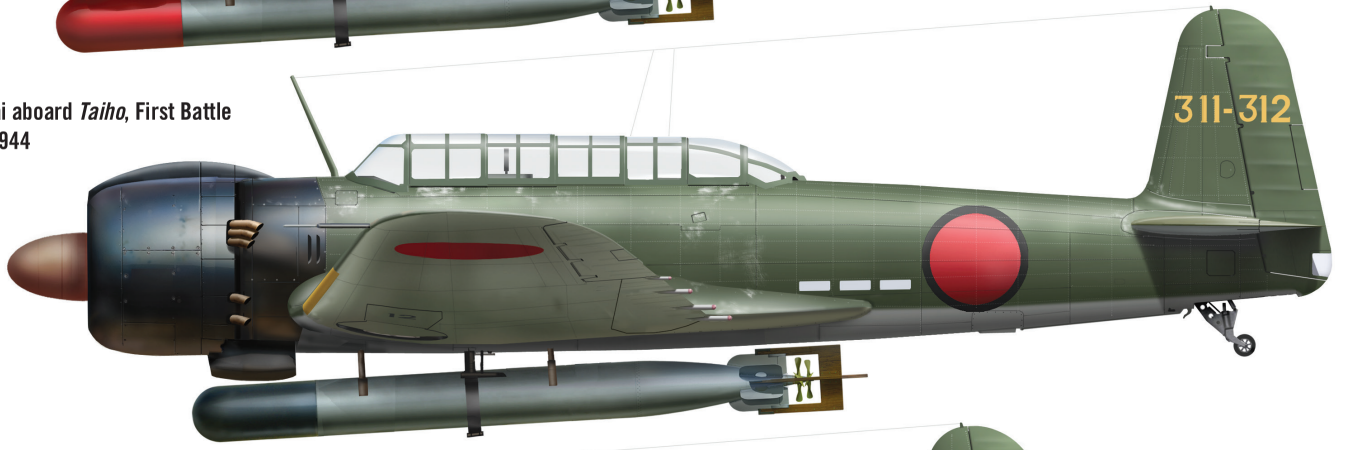
18
B6N1 '1_2-382' of 601st Kokutai, Singapore, spring 1944



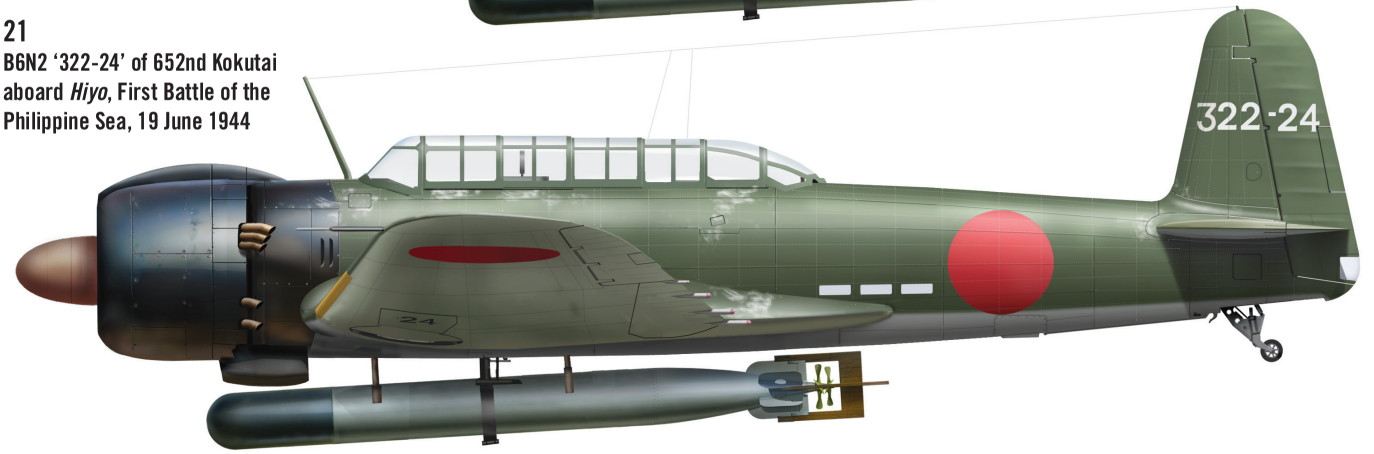
19
B6N2 '52-33' of 752nd Kokutai, Toyohashi airfield, Japan, spring 1944



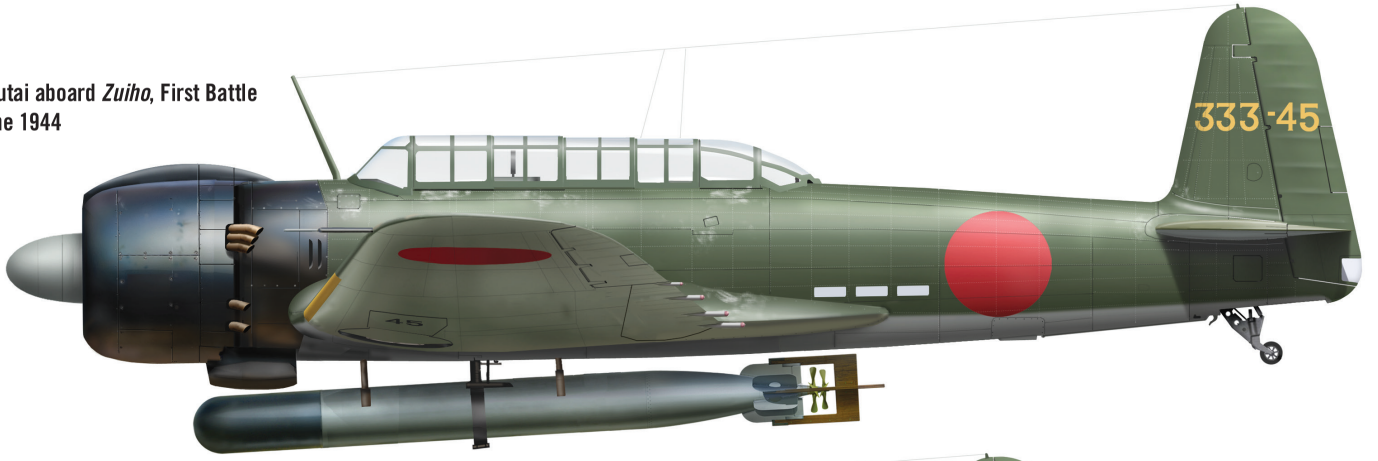
20
B6N2 '311-312' of 601st Kokutai aboard *Taiho*, First Battle of the Philippine Sea, 19 June 1944



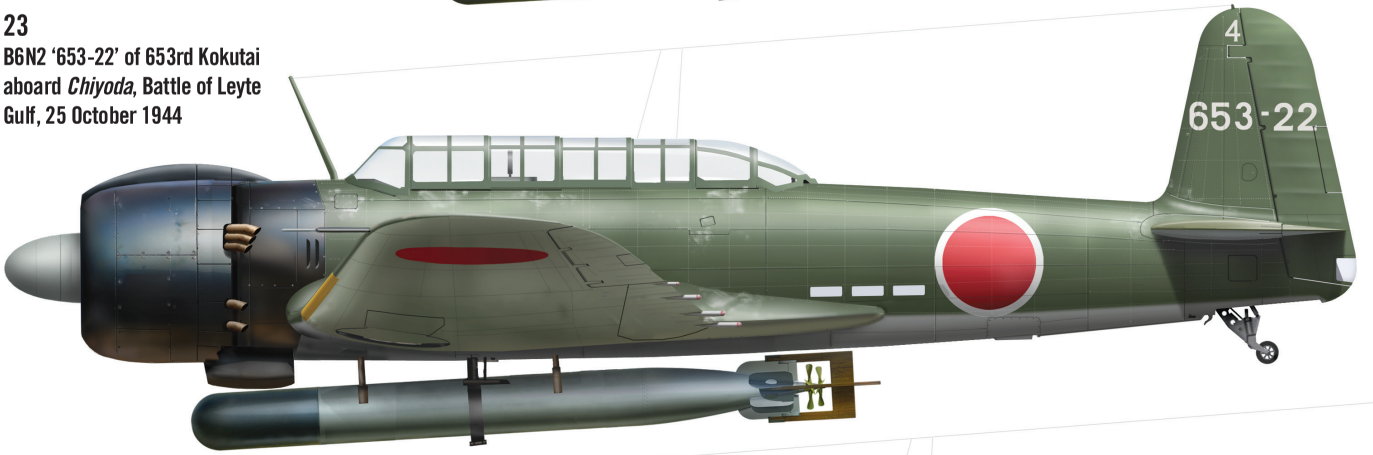
21
B6N2 '322-24' of 652nd Kokutai aboard *Hiyo*, First Battle of the Philippine Sea, 19 June 1944



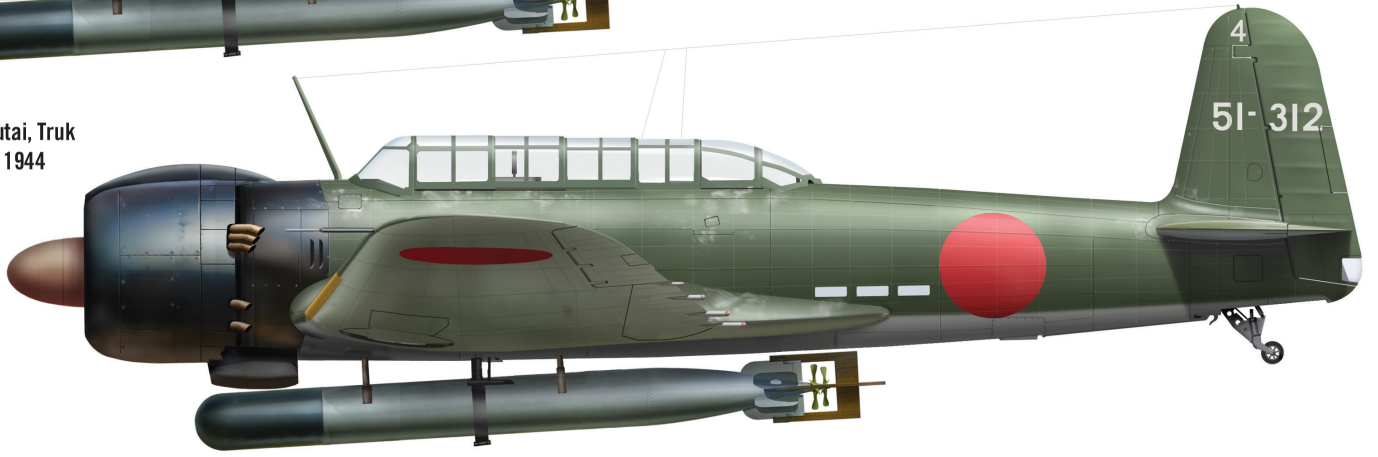
22
B6N2 '333-45' of 653rd Kokutai aboard *Zuiho*, First Battle of the Philippine Sea, 19 June 1944

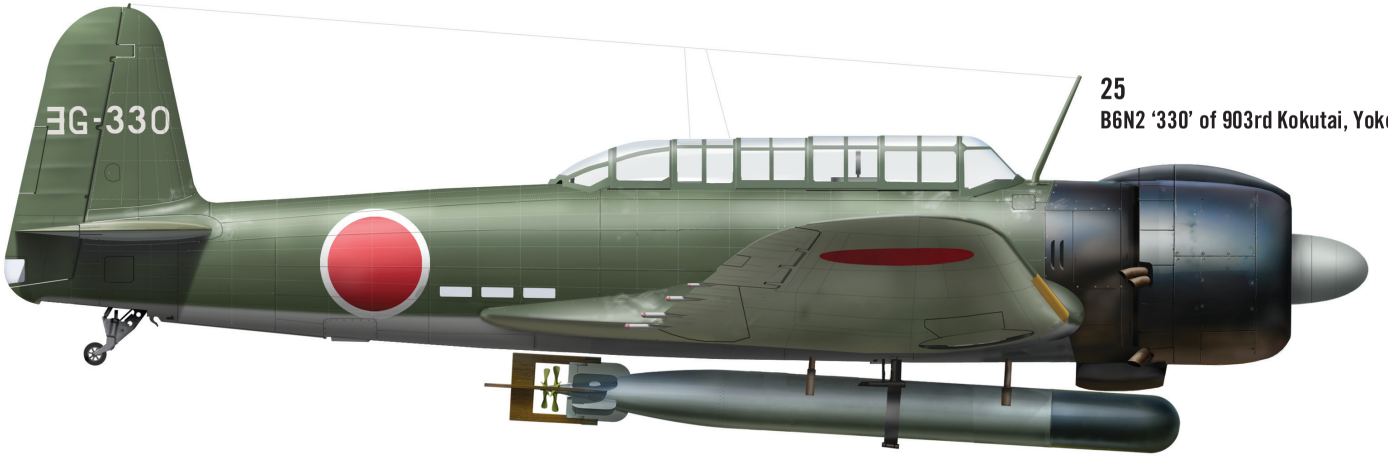


23
B6N2 '653-22' of 653rd Kokutai aboard *Chiyoda*, Battle of Leyte Gulf, 25 October 1944



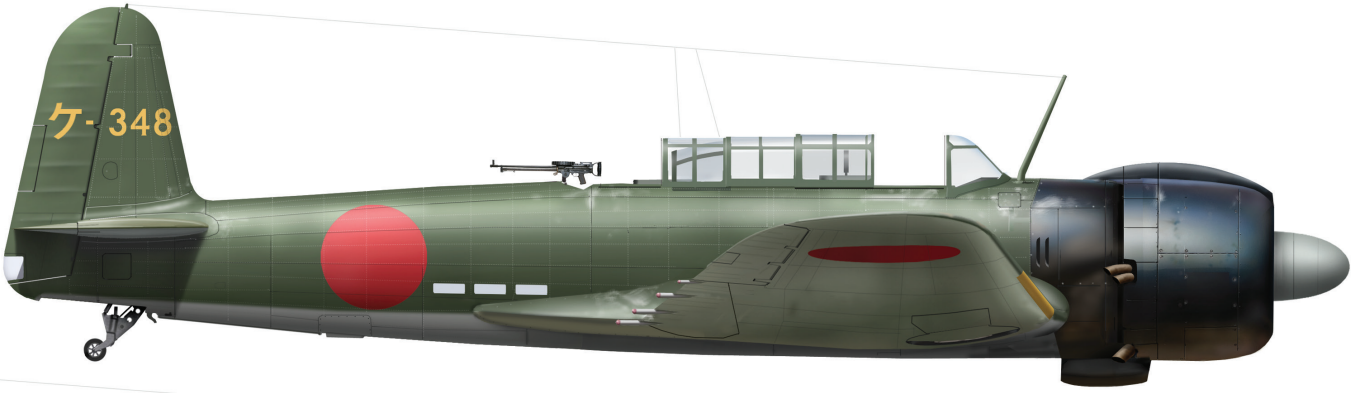
24
B6N2 '51-312' of 551st Kokutai, Truk Atoll, Caroline Islands, June 1944

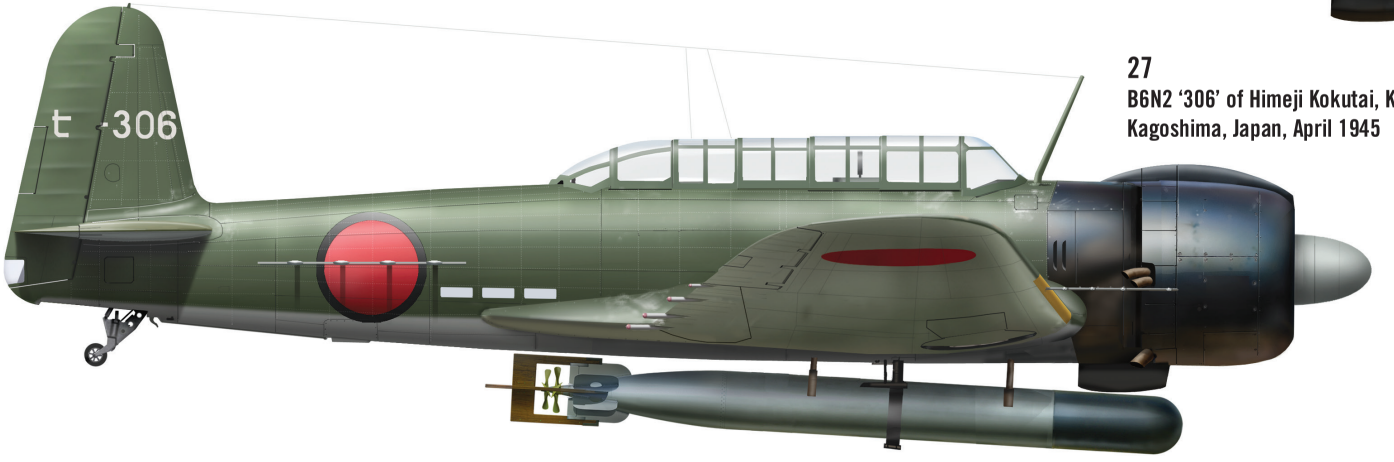




25
B6N2 '330' of 903rd Kokutai, Yokosuka, Japan, spring 1945

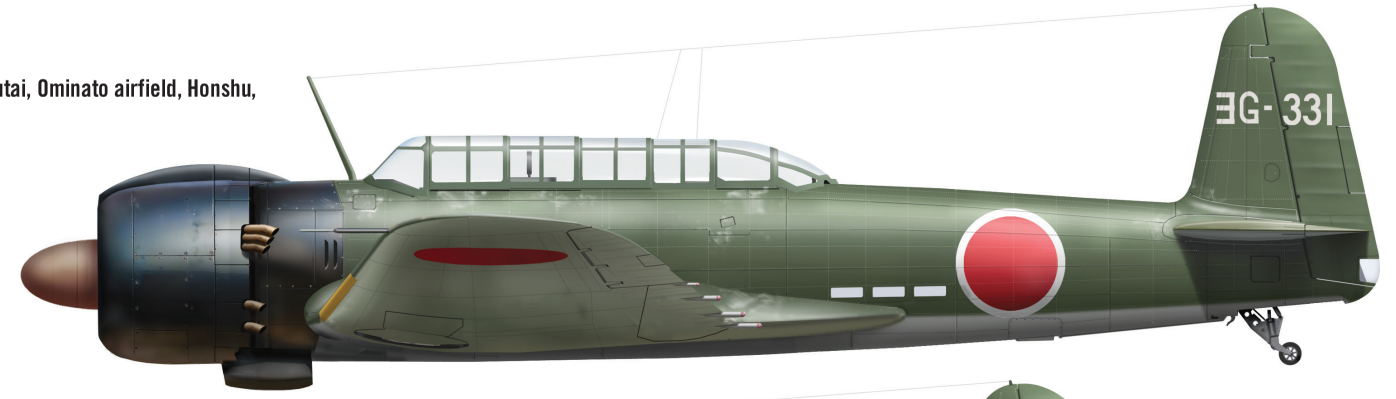
26
B6N2 '348' of Genzan Kokutai, Gannosu airfield, Fukuoka, Japan, summer 1945

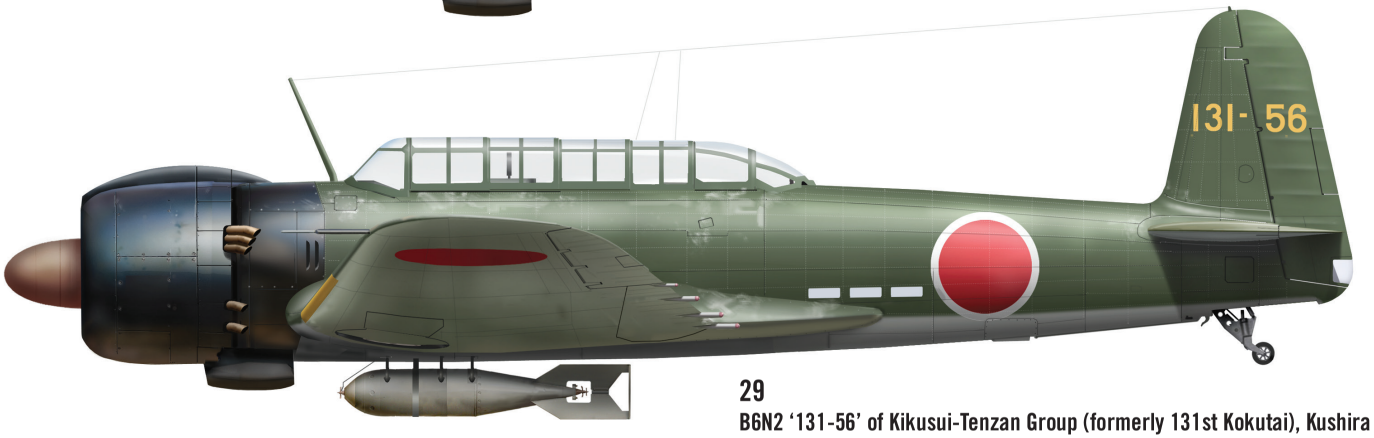




27
B6N2 '306' of Himeji Kokutai, Kushira airfield, Kagoshima, Japan, April 1945

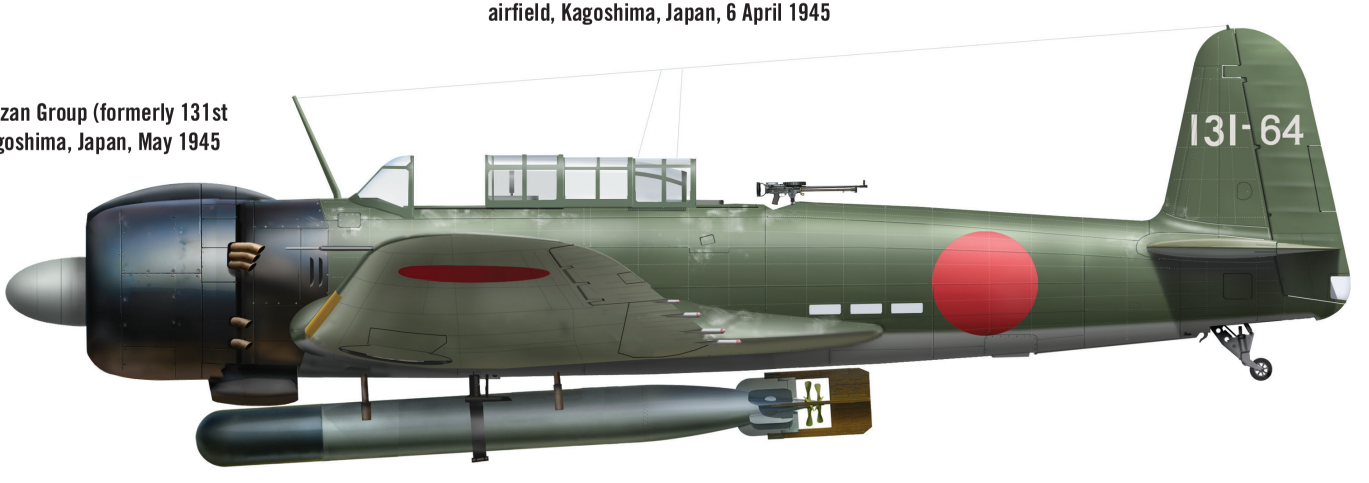
28
B6N2 '331' of 903rd Kokutai, Ominato airfield, Honshu, Japan, April 1945





29
B6N2 '131-56' of Kikusui-Tenzan Group (formerly 131st Kokutai), Kushira airfield, Kagoshima, Japan, 6 April 1945

30
B6N2 '131-64' of Kikusui-Tenzan Group (formerly 131st Kokutai), Kanoya airfield, Kagoshima, Japan, May 1945



The IJNAF was now also suffering from an acute shortage of carrier aircraft, particularly B5N2s – this was primarily due to a conscious decision to reduce attack aircraft complement and increase those of fighters and dive-bombers as part of the battle lessons learned from Midway. Overall, each of Mobile Force's surviving carrier air groups had experienced a 16 per cent decrease in their fighting power since the attack on Pearl Harbor. Exacerbating this problem was the fact that both Nakajima and Aichi had all but stopped production of the B5N2 and D3A, respectively, by mid-1942 in favour of their replacements, the B6N 'Jill' and D4Y 'Judy'. Both of the latter types were suffering with development problems, however, forcing the IJN to ask Nakajima and Aichi to restart production. Although D3A2s began to reach the fleet from Aichi in reasonable numbers by late 1942, only 56 B5N2s were delivered by Nakajima that year. With Japan's aviation industry unable to keep pace with frontline attrition, there was a growing shortage in the number of aircraft available to fleet units by the autumn of 1942.

ACTION IN THE SOLOMONS

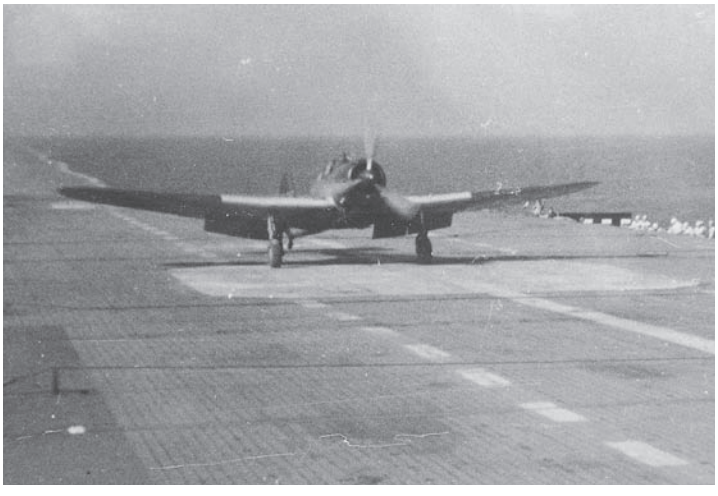
Supported by the carriers *Enterprise*, *Saratoga* and USS *Wasp* (CV-7), as well as numerous other warships, the 1st Marine Division landed on Tulagi and Guadalcanal, in the Solomons, at dawn on 7 August 1942 to signal the start of the first American offensive of World War 2. At this time the IJN's surviving carriers were in Japan's Inland Sea, near Kure, undergoing a reorganisation and training to incorporate the lessons learned at such a high cost at Midway two months earlier. On 14 July, Combined Fleet had been reorganised and the carriers placed in the paramount position for future operations. The First Air Fleet became the Third Fleet, which was now clearly established as Combined Fleet's primary offensive force. The Second Fleet, composed of fast battleships, heavy cruisers and destroyers, was to be used as an advanced screen for the carriers.

Even after the heavy carrier losses at Midway, the Japanese still retained five carriers suitable for fleet work, with another soon to be completed. These six ships actually outnumbered the four carriers remaining to the Pacific Fleet, but their combined aircraft capacity totalled about 300 aircraft – smaller than the total number of aeroplanes embarked in the four American ships. The new Third Fleet was composed of two carrier divisions. The centrepiece of the rebuilt Mobile Force were the two carriers of the *Shokaku* class, *Shokaku* and sister-ship *Zuikaku*. Formerly the Fifth Carrier Division, this was renamed the First Carrier Division and was under Nagumo's direct control. *Shokaku* had been under repair at Kure since 17 May and would be ready by late July. Joining the two big carriers was the converted light carrier *Zuiho*. The old Fourth Carrier Division was now re-designated as the Second Carrier Division and was placed under the command of Rear Admiral Kakuji Kakuta. It included the converted passenger liners *Junyo* and *Hiyo* (due to be completed in July) and the light carrier *Ryujo*.

Initially, opposition to the landings in the Solomons was left to locally based IJNAF units flying from Rabaul, with Zero-sens escorting G4M

'Betty' bombers and 'Vals' on a series of raids against Allied ships and the newly operational Henderson airfield. There were no 'Kates' in-theatre at this time.

Finally, on 16 August, Nagumo's carriers departed the Inland Sea for Truk to provide cover for transports bringing Japanese reinforcements to Guadalcanal and to engage the US Fleet. *Shokaku* and *Zuikaku* each had 18 'Kates' within their respective air groups, whilst the smaller *Ryujo* had nine B5N2s embarked. Although there were considerably fewer 'Kates' than Zero-sens (76) or 'Vals' (54) for the impending Battle of the Eastern Solomons, they nevertheless gave Mobile Force a real edge going into the Guadalcanal campaign, for it meant that the Japanese possessed a proven torpedo attack capability.



This storeless 'Kate', seen landing back aboard *Shokaku* in October 1942, was one of 51 B5N2s committed to the Battle of Santa Cruz later that month. Note the arrester wires stretched across the flightdeck (*Tony Holmes*)

The 'Kate' was inferior in performance to its new American counterpart, the TBF Avenger, but what made the Japanese torpedo-bomber so formidable was that it could employ a dependable air-launched torpedo. This was the Type 91 Mod 3 Air Torpedo, which contained a 235 kg warhead and was capable of travelling at 42 knots for up to 2000 yards. The importance of the combination of the B5N2 and its reliable and effective torpedo cannot be understated. Both at Coral Sea and Midway, this combination gave IJNAF air groups an effective ship-killing power not possessed by American carriers of the day. At both battles, once an American carrier was struck by an air-launched torpedo, it did not escape destruction.

However, the B5N2 (like any torpedo-bomber) was required to fly relatively low and slow towards the target, making it very vulnerable to enemy fire. This weakness was exacerbated by the fact that the aircraft had exchanged range for a lack of protection. During the first part of the war, Japanese tactics when targeting heavily defended naval targets were to attack simultaneously with dive- and torpedo-bombers to overwhelm the defenses and minimise losses to the more vulnerable torpedo-bombers. Going into the Guadalcanal campaign, the Japanese decided to hold their torpedo-bombers in reserve until the dive-bombers had crippled the American carriers. This tactic proved unsuccessful at the Battle of the Eastern Solomons, and by the time of the Battle of Santa Cruz in October 1942, the Japanese had returned to their more traditional combined-arms tactic with simultaneous dive- and torpedo-bomber attacks. These tactics had a probability of success as long as they were executed by highly trained and aggressive naval aviators. In August 1942, IJNAF carrier air groups still possessed these types of aircrew in abundance. Overall, they possessed a higher level of training and experience than US Navy air groups of the period.

For his first attempt to engage and destroy the American fleet, Admiral Yamamoto, commander of Combined Fleet, committed the First Carrier

Division. However, instead of *Zuiho*, *Ryujo* took its place. The Second Carrier Division would take another month to be ready. Overall Japanese planning was based on a faulty assumption that the American invasion of Guadalcanal was merely a raid. Yamamoto's operation had two primary objectives. The foremost was the destruction of the American fleet. The secondary objective was to move a reinforcement convoy to the island. This consisted of three ships and carried only 1500 troops. To support the convoy, aircraft from Rabaul would strike Henderson Field with daily attacks, and cruisers from Rabaul would bombard the airfield nightly.

As usual, the Japanese plan was complex. In addition to the Kido Butai, Nagumo created a detached carrier group – which included *Ryujo* – to strike Henderson Field. Supporting the carriers, and in accordance with the new Japanese doctrine, was the Vanguard Force and the Support Force.

The first 'Kates' to see action over Guadalcanal were the aircraft from *Ryujo*, which had been detached from the First Carrier Division to conduct a strike on Henderson Field in an attempt to neutralise it. Just after noon on 24 August, six B5N2s, armed with bombs rather than torpedoes and escorted by 15 Zero-sens, attacked the airfield. The strike went badly for the IJNAF, with three fighters and four 'Kates' being shot down by the defending US Marine Corps Wildcats and Dauntlesses and USAAF P-39/400s directly over the airfield. Things got no better for the surviving crews when they discovered that their carrier had in turn been sunk whilst they were attacking Henderson Field. *Ryujo* had been spotted by US Navy PBYs as early as 0935 hrs, but Rear Admiral Frank Fletcher declined to send his carrier aircraft to attack it until the two IJN fleet carriers had been found too. This did not happen until 1400 hrs, by which time the location of the American carriers had been relayed to Nagumo by two IJNAF search aircraft from the heavy cruiser *Chikuma*.

Twenty minutes earlier, and still with no information available on the whereabouts of Nagumo's main carrier force, Fletcher launched a strike from *Saratoga* on *Ryujo*. At 1410 hrs the light carrier was spotted again, and 50 minutes later *Saratoga* received a report that two of *Enterprise*'s SBDs had unsuccessfully attacked *Shokaku*. This development put Fletcher in an unenviable position, for his main strike was en route to strike a secondary target (*Ryujo*), and now he had information on the location of the main Japanese carrier force. At 1550 hrs, the attack by *Saratoga*'s strike group began. After successfully dodging the first ten or so bombs, *Ryujo* was struck by as many as three bombs and a torpedo hit to starboard. It later sank at 2000 hrs with the loss of 121 crewmen. The surviving aircraft from the Guadalcanal strike and the ship's CAP fighters were forced to ditch alongside escorting destroyers.

The Japanese response to this attack was not long in coming, for Nagumo had despatched 27 'Vals' and nine Zero-sens from *Shokaku* and *Zuikaku* at 1455 hrs against the American carriers. All his remaining dive-bombers (27) and nine more fighters were despatched at 1600 hrs. Crucially, none of the B5N2s had been committed to the action. *Enterprise* was subsequently hit by three bombs, which 'wounded' the carrier, but not seriously. No fewer than 17 'Vals' and three Zero-sens were lost in the attack. The second wave of IJNAF aeroplanes failed to find their target, passing 50 miles south of *Enterprise* before turning northwest and

departing the area. Similarly, aircraft from *Saratoga* and *Enterprise* failed to find *Shokaku* and *Zuikaku.* With US carriers still very much at large and Henderson Field generating an increasing number of sorties, Yamamoto was forced to order the cancellation of the reinforcement operation for Guadalcanal on 25 August.

Following a two-week period of rest and replenishment, the Kido Butai, with carriers *Shokaku*, *Zuikaku* and *Zuiho*, departed Truk on 9 September to support the latest Japanese land attempt to seize Henderson Field. Yamamoto planned for Vice Admiral Nobutake Kondo's Support Force (composed of the Advance Force and Nagumo's carriers) to move south to eliminate the American carriers after the airfield had been captured. The Japanese carrier air groups would not be committed to help neutralise Henderson Field – that was a job for the land-based aircraft operating from Rabaul. The carrier aircraft had to be preserved for the anticipated carrier battle. Although the opposing carrier groups (*Wasp* and *Hornet* were in the area) struggled to locate each other northeast of the Santa Cruz Islands, and thus launch attacking strikes, *Wasp* was sunk by the IJN submarine *I-19* on 15 September.

After two failed attempts to dislodge the Marines from Guadalcanal, Yamamoto changed his strategic focus from destroying the Pacific Fleet to supporting the land offensive to seize Henderson Field. He devised a combined sea and air operation to neutralise the airfield, thus allowing sufficient ground forces to be landed to seize it successfully. After that had been accomplished, Combined Fleet would close on Guadalcanal to destroy the American fleet as it rushed to the aid of the Marines. On 11 October Yamamoto put his plan in motion, IJN warships bombarding Henderson Field and escorting six transports that landed 4500 troops on Guadalcanal.

The IJNAF became involved on 17 October when *Hiyo* and *Junyo* of the Second Carrier Division launched 18 Zero-sens and 18 'Kates' (nine from each carrier, and armed with an 800-kg bomb apiece) at 0515 hrs against American transports, and their escorts, off Lunga Point, on the north coast of Guadalcanal. One B5N2 from *Junyo* aborted the mission due to mechanical trouble shortly after takeoff and returned to its carrier. At 0700 hrs, Florida Island was sighted and both air group commanders decided to attack the destroyers USS *Aaron Ward* (DD-483) and USS *Lardner* (DD-487). These ships were on a shore bombardment mission targeting Japanese supply dumps.

At 0727 hrs *Hiyo*'s nine B5N2s targeted *Aaron Ward*, failing to score any hits and losing a 'Kate' to the ship's AA fire. Shortly afterwards, *Junyo*'s eight remaining B5N2s attacked *Lardner*, although they were engaged by F4Fs from VMF-121 as they commenced their bombing runs. In the ensuing action, three 'Kates' were shot down and two damaged. At 0735 hrs, having failed to score any hits on *Lardner*, three more B5N2s from *Junyo* fell to the F4Fs and AA fire. A damaged B5N2 subsequently ditched near Rekata Island and two more landed at Buin. Of the nine *Junyo* B5N2s, only the aeroplane that aborted the mission returned safely to the carrier. The first combat operation undertaken by the Second Carrier Division had been a total failure.

On 21 October an engine room fire broke out on *Hiyo*. Repairs by its crew brought the ship's speed back up to 16 knots, but this was insufficient

for the carrier to continue operations. The next day, Rear Admiral Kakuta sent the carrier to Truk with two destroyers. Before departing, *Hiyo* transferred three Zero-sens, one 'Val' and five 'Kates' to *Junyo*, as well as sending other aeroplanes ashore to operate from the airfield at Rabaul. Nevertheless, the departure of *Hiyo* took 16 fighters and 17 carrier bombers out of the battle.

The Santa Cruz Islands, which lent their name to the fourth aircraft carrier battle of the Pacific War, had no geographic impact upon the Guadalcanal campaign. Lying some 300 miles east of the Solomons, they were well beyond the range of the ragtag 'Cactus Air Force' desperately trying to defend their airfield from the invading Japanese. However, the fleet engagement of 26 October 1942 was an integral part of the seesaw contest for control of Henderson Field.

The US Navy's Task Force 61 was formed around two carriers (*Enterprise* and *Hornet*) with 169 aircraft embarked between them, and they were opposed by the Kido Butai's three 'flattops' (*Shokaku*, *Zuikaku* and *Zuiho*), with 207 aeroplanes embarked – including 42 B5N2s – and the Second Carrier Division's *Junyo* with 45 aeroplanes embarked (including nine 'Kates'). The Battle of Santa Cruz odds of four carriers to two represented the greatest disparity that American naval aviators would face in the Pacific War.

During the early hours of 26 October, Nagumo prepared his three carriers for the next day, with initial search, CAP and strike aircraft arrayed on the flightdecks and a second strike fuelled and armed on the hangar decks. At 0445 hrs, the Japanese launched 14 'Kates' to search the sectors from 050 to 230 degrees out to 300 miles. For the search, *Shokaku* and *Zuikaku* each contributed four aircraft and *Zuiho* six. At 0520 hrs, *Zuiho* launched the first CAP mission of the day with three fighters. An additional 22 fighters were on deck standby and a total of 70 aircraft were spotted for the first strike. This included 20 aircraft from *Shokaku*'s 'Kate' squadron and 22 'Vals' from *Zuikaku*.

At 0658 hrs Nagumo was informed that the US carriers were only 210 miles away. Two minutes later, the Second Carrier Division was spotted by SBDs from *Enterprise*, the sighting putting the carriers 185–200 miles to the northwest of the American 'flattops'. Both fleets immediately launched their respective strike forces, the IJNAF aircraft taking off from 0710 hrs. The strike was led by Lt Cdr Shigeharu Murata from *Shokaku*. The most accomplished torpedo-bomber pilot in the IJN, he had commanded the 24 torpedo-bombers at Pearl Harbor that had laid waste to Battleship Row. From *Shokaku* came four fighters and 20 torpedo-bombers. From *Zuikaku*, beginning at 0725 hrs, were launched eight fighters, 21 dive-bombers (another was forced to abort) and a solitary B5N2 without a torpedo that was tasked with tracking the American carrier force. The light carrier *Zuiho* contributed nine fighters and another 'Kate' serving as a shadow aircraft.

Less than 20 minutes later, two SBDs that had been searching for the IJN carriers succeeded in attacking *Zuiho* and hitting it with a single 500-lb bomb, starting a fire aft and wrecking its arresting gear. Unable to recover aircraft, *Zuiho* was out of the battle.

Alarmed by this surprise strike, and fearing a repeat of the Midway disaster, Nagumo immediately ordered a second wave of aircraft aloft. Flightdeck

crews on both carriers worked feverishly to prepare the aeroplanes for launch. The 'Val' squadron on *Shokaku* needed less time to prepare than the 'Kate' squadron on *Zuikaku*, where all available personnel were still loading the heavy torpedoes. Nagumo ordered that the *Shokaku* attack group be launched as soon as possible without waiting for the aircraft from *Zuikaku*. The first aircraft took off from *Shokaku* at 0810 hrs, and by 0818 hrs the strike force of five Zero-sens and 20 'Vals' were headed towards the American carriers. One of the dive-bombers later aborted. *Zuikaku* launched 17 'Kates' (one without a torpedo to act as a shadow aeroplane) and four fighters following behind the *Shokaku* dive-bombers. The strike departed at 0900 hrs.

Since the American and Japanese strike groups were headed on reciprocal bearings, many aircrews spotted each other heading in opposite directions. At about 0835 hrs, the escort of the *Shokaku* strike, which included the nine Zero-sen fighters from *Zuiho*, spotted another group of American aircraft. This was the 20-strong *Enterprise* group. The leader of *Zuiho*'s fighters could not resist this target and dove down from 14,000 ft to conduct a swift attack to break up the unsuspecting American formation, before rejoining Murata's vulnerable torpedo-bombers. Although the IJNAF fighters succeeded in breaking up the *Enterprise* group, it had lost four Zero-sens. The remaining five returned to their ship, their ammunition exhausted, rather than continuing to escort the 'Kates'. This would prove to be a fateful error.

Shokaku was badly damaged in the first attack by SBDs from *Hornet* at 0927 hrs, being hit at least four times by 1000-lb bombs. Only two aircraft – both 'Kates' – were aboard the ship at the time, parked on the flightdeck. One was consumed by fire but the other example survived. Although seriously damaged, the carrier remained afloat thanks to tireless work by damage control teams.

At 0910 hrs Murata's strike group commenced its attack on *Hornet*. He had deployed his torpedo-bombers in two groups to attack in an anvil formation from both sides of the carrier's bow. He led 11 'Kates' and four fighters to the south, diving to gain speed, while the remaining nine torpedo-bombers came in from the north. Immediately prior to the B5N2s running in on the carrier, the 'Vals' started to dive on *Hornet*. The Japanese had achieved a fully coordinated attack, the carrier being struck by three 250-kg semi-armour-piercing bombs.

With the first flight of 'Vals' having now completed their attack, the 'Kates' made theirs. Their escort intervened against intercepting Wildcats, shooting down two for the loss of a single Zero-sen. Murata's plan of executing an anvil attack from ahead of *Hornet* was upset when the carrier and its escorts changed course to the northeast. This forced Murata's group into a tactically disadvantageous stern attack. The 11 torpedo-bombers increased speed to at least get a beam

One of Lt Cdr Shigeharu Murata's 'Kates' commences its torpedo run against the carrier *Hornet*. The aircraft has clearly yet to drop its weapon. Twenty B5N2s were involved in the strike led by Murata, the most accomplished torpedo-bomber pilot in the IJN who had commanded the 40 'Kates' that had laid waste to Battleship Row with their Type 91 weapons. This photograph was taken from the heavy cruiser *Pensacola*, with the heavy cruiser *Northampton* in the background (*Naval History and Heritage Command*)

shot while *Hornet*'s captain attempted to keep his stern to the attackers to give them as small a target as possible.

The first group to attack consisted of the three aeroplanes led by Murata. Flying at 300 ft, they approached *Hornet* from its starboard quarter. The first 'Kate' dropped its torpedo from 1500 yards and was then shot down. The next two closed to within 1000 yards before dropping their weapons. After banking away, Murata's aircraft was hit and crashed off *Hornet*'s starboard side. The third aircraft survived.

Although the torpedoes had not been launched from a good angle, the attack was devastating. At 0915 hrs, the first weapon struck *Hornet* amidships just aft of the island. Within seconds, the next torpedo struck aft in the engineering spaces. The third torpedo just missed ahead. The results were immediate. The forward engine room and two firerooms were knocked out by flooding, causing the ship to lose power and come to a stop. It also took on a ten-degree starboard list.

The next group of three torpedo-bombers followed a minute later. The first aircraft was shot down after jettisoning its torpedo, and the other two missed with their torpedoes to starboard. As *Hornet* continued its turn to the northwest, the attack angle for the final five aircraft became even worse. The next group of three passed through the defensive screen to attack *Hornet*. One aircraft jettisoned its torpedo and was shot down exiting the formation, while the other two missed with their torpedoes but survived. The final two aircraft decided to attack the heavy cruiser USS *Pensacola* (CA-24). One launched its torpedo and missed, and the other, aflame from AA fire, attempted to crash into the cruiser. It missed *Pensacola*'s bow by only a few feet before hitting the water.

Murata's torpedo-bombers had delivered the most important blows of the entire battle. From his 11 aircraft, eight torpedoes were launched at *Hornet* and two struck. Five 'Kates' had been shot down by either AA fire or F4Fs.

A second group of 'Vals' had attacked *Hornet* just as Murata's 'Kates' were torpedoing the carrier, and although none hit the ship with their ordnance, a flaming dive-bomber crashed into the flightdeck after bouncing off the island. The third group of 'Vals' fell foul of the F4F CAP and failed to hit *Hornet*.

This action photograph, taken from a US Navy warship during the Battle of Santa Cruz on 26 October 1942, shows a 'Kate' (centre) seconds before it crashed into the ocean, while a second B5N2 (right) successfully evades AA fire from US warships, including USS *Juneau* (CL-52) off to its left. Both aeroplanes appear to have already dropped their torpedoes (*US National Archives at College Park, MD, Still Pictures Branch*)

The last formation from the initial IJNAF strike to attack *Hornet* and its escorts were the nine *Shokaku* B5N2s that came in from the north. Devoid of their Zero-sen escort following the latter's earlier skirmish with the TBFs and F4Fs from *Enterprise*, the 'Kates' were assailed by Wildcats. Three were shot down (by Ens George Wrenn of VF-72, who was credited with five destroyed) and one attempted to crash into the light cruiser USS *Juneau* (CL-52), but it too was downed in the attempt. The remaining five approached the carrier's screen of escort ships, and another was shot down by the destroyer USS *Morris* (DD-417). The surviving four closed to within 300–800 yards of *Hornet*'s bow before releasing their torpedoes, but scored no hits. One more 'Kate' from this group, having previously jettisoned its torpedo, approached *Hornet* from dead ahead in an attempt to crash into the carrier but it struck the water before reaching the ship.

The attack on *Hornet* represented the finest, and certainly the last, coordinated strike by Japanese aircraft on an American carrier. The result was serious damage to the ship – it was left dead in the water from two torpedoes, three bomb hits and two crashed aircraft. The IJNAF had paid a heavy price for this success, however, losing five Zero-sens, 17 'Vals' and 16 'Kates'.

The second wave of Japanese aircraft targeted *Enterprise* – having bypassed the badly damaged *Hornet* en route – from 1008 hrs, with 'Vals' (19 in total, from *Shokaku*, escorted by five Zero-sens) again going in first. They were followed by 17 torpedo-bombers from *Zuikaku*, escorted by four Zero-sens. Despite accurate AA fire and fighter cover, the 'Vals' hit the carrier three times, although the damage inflicted was not serious. With the surviving dive-bombers departing the area, the 'Kates' from *Zuikaku* approached the carrier from the northwest at an altitude of 13,000 ft. Waiting for them were no fewer than 24 F4Fs at medium and low altitudes.

At 1035 hrs, the B5N2 flight leader, Lt Shigeichiro Imajuku, made visual contact with *Hornet* and its escorts. Minutes later, he saw *Enterprise* and its escort screen steaming to the southwest. He chose the seemingly undamaged carrier as his target. Imajuku's plan was to divide his force into two eight-aeroplane groups to attack the carrier from either side of its bow. The first group headed south through a bank of clouds while the second group, with all four fighter escorts, continued heading to the southeast through the same bank of clouds.

Imajuku's eight aircraft attacked first. Since they were unescorted, Imajuku moved to wave-top level some distance from *Enterprise*. Only a single aircraft was engaged by fighters before reaching the American ships – this was Imajuku's aircraft, shot down at about 1046 hrs. His wingman launched his torpedo from *Enterprise*'s starboard beam and missed. The next section came in from the carrier's starboard bow and launched their torpedoes. *Enterprise* made a sharp turn to starboard and was successful in evading all three.

The final section of two aircraft was unable to get a proper attack position on *Enterprise* so they went after the battleship *South Dakota* trailing astern. The first aircraft released its torpedo and missed, but the second aircraft was set ablaze by AA fire and continued to approach the battleship. The pilot got so close that when he finally launched his torpedo it flew over *South Dakota*'s stern and entered the water 20 yards off its port quarter. The 'Kate' crashed 200 yards farther away.

A 'Kate' severely damaged by F4F Wildcats from *Enterprise* dives towards the destroyer USS *Smith* (DD-378) on 26 October. The aeroplane, from *Zuikaku*, struck the ship's forecastle and set the vessel on fire. No fewer than 57 sailors were killed as a result, many of them perishing when a delayed detonation from the aircraft's Type 91 torpedo resulted in additional damage being inflicted on the destroyer. Thanks to effective firefighting and damage control *Smith*, nevertheless, survived. Indeed, the ship's gunners were credited with downing six of the torpedo-bombers that attacked the US Navy task force (*US National Archives at College Park, MD, Still Pictures Branch*)

The last aircraft from Imajuku's section conducted its attack run from dead ahead of *Enterprise*. The torpedo was not sighted until it was 800 yards away, and a sharp turn made it miss only 100 yards off the starboard side. The aircraft was shot down by an AA gun mounted on the carrier's bow.

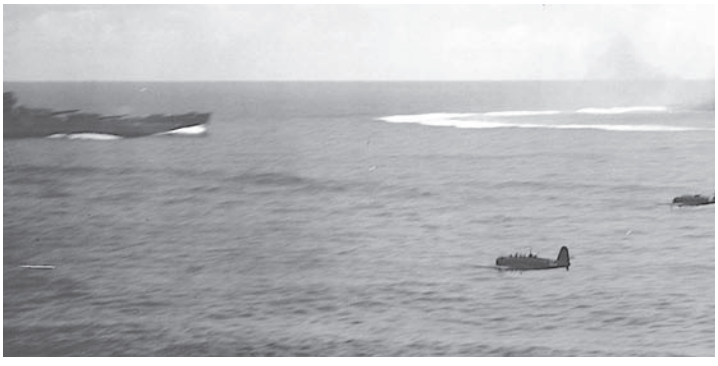
The second group of eight aircraft was roughly handled as it dropped through the clouds, being caught by two F4Fs from VF-10. One of the latter machines was flown by veteran naval aviator and future ace Lt Stanley 'Swede' Vejtasa. A former SBD pilot with several Zero-sen victories to his credit, he was about to see combat in the Wildcat for the first time.

Quickly downing four 'Kates' in cloud, Vejtasa then broke into clear sky and spotted *Enterprise* twisting and turning as it fought off a new attack. Low on fuel and ammunition, he headed for the carrier hoping that he might get aboard. Suddenly, two more 'Kates' emerged from the clouds off to his left, and he destroyed both of them too. The last of his victims was the aircraft flown by SN1 Kiyomi Takei, who was fully aware that he was flying too fast to drop his torpedo. He seemed to aim for *South Dakota*, but then deliberately steepened his dive and crashed into the destroyer USS *Smith* (DD-378),). The aircraft struck the destroyer's No 2 five-inch gun mount, the wrecked 'Kate' rolling off the side of the vessel into the sea. Its torpedo, however, remained on board, 'rolling around in the flaming aftermath. It quickly cooked off and blew the hell out of everything', Vejtasa later recalled.

The remaining five torpedo-bombers from *Zuikaku* that had escaped interception by VF-10 attempted to get into a launch position off *Enterprise*'s port bow. The carrier, in turn, attempted to keep its stern to the approaching Japanese aircraft in order to present as small a target as possible. One of the five launched its torpedo from dead astern and was shot down by AA fire. The torpedo missed. The last four launched torpedoes from the carrier's port quarter, but only one even came close. The attack was over at 1052 hrs. F4Fs subsequently shot down two more B5N2s on their way out of the battle area.

The torpedo-bomber attack against *Enterprise* was the key point in the battle. If even a single torpedo had hit the carrier, it could have meant disaster. In the three previous carrier battles, any time that a Japanese air-launched torpedo hit a 'flattop', it was enough to start a chain of events leading to the loss of the ship. The same fate awaited *Hornet* at Santa Cruz. Of the 16 torpedo-bombers that began the attack, nine launched their weapons at *Enterprise*. On this occasion, the CAP had done a credible job by savaging one of the two groups of 'Kates' and disrupting the coordination between the two groups. The escape of *Enterprise* was certainly a close-run thing.

By then *Junyo* had also launched a strike consisting of 12 Zero-sens and 17 'Vals'. These aircraft were launched at 0905 hrs some 280 miles from the two American carriers. The dive-bombers targeted *Enterprise* from 1120 hrs, although their attack was badly affected by low cloud cover and no hits on the carrier were achieved. A number of the 'Vals' were forced to attack the carrier's escort vessels instead.



Having made an unsuccessful torpedo attack on *Enterprise*, two B5N2s from *Zuikaku* leave the combat area during the Battle of Santa Cruz by flying between their target and the battleship *South Dakota*, the bow of which is visible to the left in this remarkable photograph taken from CV-6. A total of nine out of the original 16 'Kates' that made the torpedo attack on *Enterprise* and its escorts were lost (*US National Archives at College Park, MD, Still Pictures Branch*)

Nagumo's ability to launch additional attacks was limited by the heavy losses the IJNAF had suffered during the morning raids – both to enemy action and fuel starvation. Indeed, 13 aircraft from the first wave of attacks had been forced to ditch, including five 'Kates'. He now only had two serviceable carriers. For the US Navy, the situation was somewhat reversed, as it still had plenty of aircraft but only one operable carrier, albeit damaged. *Hornet* was dead in the water and proving difficult to take under tow. Fearing more aerial attacks, the decision was taken to withdraw *Enterprise* from the area.

Anxious to finish off the damaged American carriers, Yamamoto ordered another strike with the remaining aircraft on board *Zuikaku* and *Junyo*. At 1313 hrs the latter carrier launched seven 'Kates' (only six were armed with torpedoes) and eight Zero-sen escorts – the fighters came from three different parent carriers. At the same time, *Zuikaku* was also putting together what was available for its third strike of the day. This one included five fighters (from two different carriers), two 'Vals' and seven 'Kates' (six armed with 800 kg bombs and the last to act as a tracker aircraft).

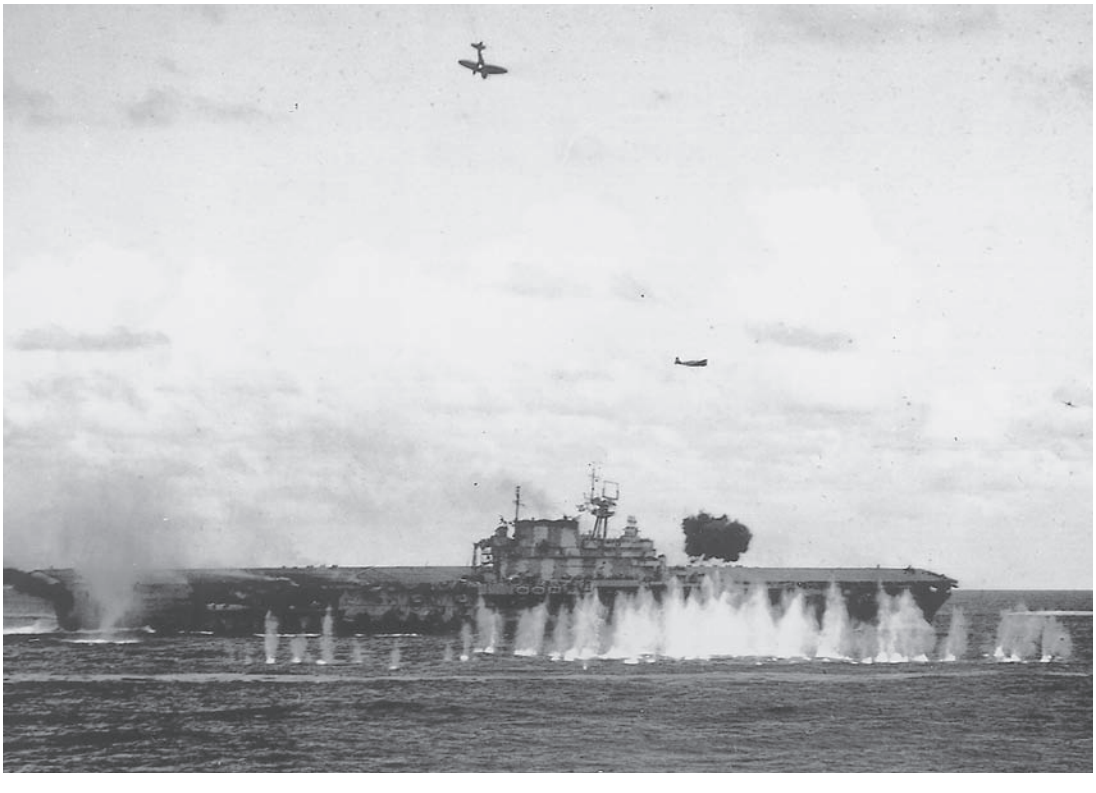
Although *Enterprise* was now out of range of these machines, *Hornet* and its escorts were not. They had been left to fend for themselves after CV-6's fighter CAP had fled southeast with its carrier. At 1513 hrs, having failed to find *Enterprise* after combing the area for almost two hours, *Junyo*'s strike leader spotted the damaged *Hornet* and with no other targets in the offing, decided to attack it. With the Japanese aircraft inbound, the cruiser USS *Northampton* (CA-26) cast off its tow line to *Hornet* and prepared to defend the crippled carrier. The six B5N2s armed with torpedoes all attacked from *Hornet*'s starboard side. The strike leader skilfully placed his torpedo just aft of the two previous torpedo hits. The remaining five torpedoes failed to score, but the one hit was sufficient to increase the list to some 14 degrees and make any successful salvage operation unlikely. The successful torpedo pilot was shot down by AA fire after his drop, as was another 'Kate'. Next to find *Hornet* were the two 'Vals' from *Zuikaku*. These attacked at 1541 hrs and scored a near miss.

With the list of his carrier increasing to 20 degrees, Capt Charles Mason ordered his crew to abandon ship just after the dive-bombing attack. During the early process of abandoning ship, the six *Zuikaku* 'Kates' operating as level bombers with large 800 kg bombs executed an attack run at 1555 hrs from 8000 ft off *Hornet*'s port quarter. One of the bombs hit aft on the flightdeck but caused little damage. The rest missed astern. The

final attack of the day occurred at 1650 hrs when four 'Vals' from *Junyo* arrived on the scene, one scoring a hit forward of the island that penetrated the flightdeck and exploded on the hangar deck, causing a fire. *Hornet* was now abandoned to its fate, the ship failing to sink after being hit by ten torpedoes and 430 five-inch shells expended by escorting American destroyers. It was then hit by four more torpedoes from two IJN destroyers, the carrier finally sinking at 0130 hrs on 27 October.

The IJN carriers had all withdrawn to Truk by 30 October, by which point the Japanese had claimed victory in the Battle of Santa Cruz. Their success had come at a high price in aircraft, with 99 (including 30 'Kates' of the 57 fielded) being lost to all causes. More worrying for the IJNAF was the loss of aircrew – 68 pilots and 77 observers. Total aircrew losses at Midway had been 110. Furthermore, no fewer than 23 of those killed on 26 October were section, squadron or air group leaders, and they would prove hard to replace. These losses in men and materiel meant that the Japanese carrier force would be in no shape to engage their US Navy counterparts until June 1944.

Junyo and the repaired *Hiyo*, as the only serviceable carriers still operating in the South Pacific, would remain active during the final months of 1942. Their modest air groups (with 50 Zero-sens, 27 'Vals' and 18 'Kates' between them) attacked American supply convoys to Guadalcanal, provided support for a reinforcement convoy bound for the island and attempted to engage the now repaired *Enterprise* and its task force. The ships' B5N2s would operate exclusively as scouts during this period, flying patrols in search of enemy ships operating off the Solomons.



A *Zuikaku* 'Val' dive-bomber that was hit by AA fire is seen here moments before it crashed into *Hornet* during the Battle of Santa Cruz. A *Shokaku* 'Kate' is flying over the doomed carrier, having just launched its torpedo at *Hornet*. Two B5N2s from *Shokaku* and one from *Junyo* scored torpedo hits on CV-8, leaving it immobilised and listless in the water. *Hornet* was subsequently abandoned and sunk by torpedoes launched from two Japanese destroyers on 27 October. This photograph was taken from the heavy cruiser *Pensacola* (*Naval History and Heritage Command*)

CHAPTER THREE

LAND ATTACK OPERATIONS AND OTHER ROLES

By 8 February 1943 Guadalcanal was finally secured by US forces, the Japanese also suffering a series of reversals at this time in other campaigns in the Southwest Pacific. With the Japanese Army Air Force (JAAF) struggling to provide adequate aerial support for the ground war in New Guinea, it fell to the IJNAF, and specifically the carrier air groups in the region, to check the rise of Allied forces in the Solomons. Therefore, on 1 April 1943, *Junyo* and fellow Second Carrier Division 'flattop' *Hiyo*, as well as *Zuikaku* and *Zuiho* of the First Carrier Division, sent their aircraft ashore to the 11th Air Fleet's base at Rabaul to participate in Admiral Yamamoto's Operation *I-Go* – planned as a series of offensive raids on enermy airpower at Guadalcanal and New Guinea in an attempt to blunt the growing Allied strength in the region.

The 'Kates' were never intended to play a significant role in this ill-fated campaign, however, due to their paucity in numbers. B5N2s based at airfields on Bougainville and Kavieng, on New Ireland, undertook anti-submarine and shipping air cover sorties around Japanese bases instead. It is also possible that the 'Kates' were used to provide navigational guidance for other carrier-based IJNAF aircraft flying down to Rabaul from Truk.

A pair of B5N2s from the carrier *Zuiho* fly in formation over the IJN's 'super battleship' *Yamato* at anchor inside Truk Atoll during March 1943. Part of the IJN's Striking Force Main Unit, the light carrier *Zuiho* typically embarked an air group that consisted of 30 aeroplanes, 12 of which were usually B5N2s. Having played a secondary role in the Battle of Midway, *Zuiho* participated in the Guadalcanal campaign and was lightly damaged during the Battle of Santa Cruz. Its air group disembarked several times and operated from land bases in the Southwest Pacific during 1943. Whenever the carrier was back at Truk, its air group operated from the airfield on Param Island, one of the numerous islands within Truk Atoll. Serving as a ferry carrier and training ship between deployments, *Zuiho* was finally sunk by US Navy carrier aircraft during the Battle of Leyte Gulf on 25 October 1944 (*Alamy, D44CEG*)

Having recovered from his injuries in the Battle of Midway, Cdr Fuchida, as Director of the Battle Lessons Research Committee, found himself in Rabaul at this time;

'Operation *I-Go* was an aviation showdown battle surrounding the offensive and defensive battles at Guadalcanal that had lasted for six months. Admiral Yamamoto had moved his admiral's flag from the battleship *Yamato* to Rabaul to command at the front. He did this with the intention of forcing a showdown in the air, concentrating the entire air power of the IJNAF on the battle. However, his opponent was the USAAF, and instead of a showdown the battle gradually became a war of attrition. The problem then was the supply of aeroplanes and pilots, and that proved to be our weakness. In view of these conditions Yamamoto diverted the full contingent of carrier pilots from the Third Fleet to land bases, with the excuse that necessity knows no law, and he sacrificed most of them in the aerial war of attrition.'

After conducting several massed aerial attacks against targets on and around Guadalcanal and the Russell Islands, in the Solomons, and Port Moresby, Oro Bay and Milne Bay, in New Guinea, Yamamoto halted *I-Go* on 16 April after inaccurate reports suggested the raids had been a resounding success. Towards the end of the Solomons campaign, as the IJNAF did its best to cover the evacuation of its troops from the region, twin-engined G4M 'Betty' bombers and B5N2 'Kates' began to mount torpedo attacks at dusk against Allied warships. It was hoped that by conducting these missions in near darkness, the units involved would suffer far fewer losses than had been the case during daylight torpedo-bomber operations. A US Office of Naval Intelligence (ONI) report from 1943 detailed how these missions were undertaken;

'Since the inception of the Solomons campaign, the Japanese have used the torpedo attack as one of their most important weapons of aerial offence. The first big attack on our shipping in Tulagi, after the initial landing in August 1942, was by twin-engined bombers carrying torpedoes. Since that date our shipping concentrations in advanced areas have been subjected to frequent torpedo attacks.

'Heavy medium bomber losses suffered by the Japanese in the unsuccessful daylight attack on our shipping off Rendova on 30 June 1943, and other similar experiences, have driven the Japanese to concentrate on attacks made at dusk, just before dawn or at night. They have developed coordination between float-light and flare-dropping planes and the attacking force to a noteworthy degree, and in the main night attacks have been skilfully executed. The plane types used are usually the Mitsubishi Type 1 twin-engined "Betty" bomber or the Type 97 single-engined "Kate" torpedo plane, both of which carry a single torpedo.

'With few exceptions, the pattern of attacks made under cover of darkness has been very similar. A task force is followed by snooper planes, which hover out of range and track. Where a course has been established, flares are dropped parallel and perpendicular to the course, and the attack group then closes. This procedure is varied by the dropping of flares at a distance, encircling the formation. Coloured flares are employed to distinguish between types of warships. On moonlit nights, flares occasionally are not used.

'The attacking planes, particularly "Bettys", usually come in singly, with the bulk of the attack force making its approach from one direction while one or two planes attempt to sneak in from another. Attacking planes come in low, at from 50 ft to 150 ft over the water (the more experienced the pilot, the lower the level of attack) and attempt to get in to 1000 yds or less before releasing. The planes do figure of eight curves and dips and rises to evade AA on retirement. Even on night attacks, known shoot-downs of "Bettys" have constituted a high percentage of the attacking force.

'The employment of "Kates" for night attacks has been less frequent in this area than that of "Bettys". However, they have been used, and tactics have been similar to those employed in torpedo runs by twin-engined bombers. The number of planes used varies widely, and has ranged from as low as five to as high as an estimated 25 or 30.'

One of the most successful dusk torpedo missions staged by Bougainville-based 'Kates' occurred on the night of 13 August 1943, when aircraft targeted the 9300-ton attack transport USS *John Penn* (APA-23). Its crew had just finished unloading a cargo of 155 mm ammunition off Lunga Point when the ship came under attack. Details of this event were noted in an ONI report as follows;

'The Japanese followed our planes in to Guadalcanal and sank the USS *John Penn* as she lay at anchor off Lunga Point. In conception, coordination and timing the attack was well done. Flares and high-altitude runs were used, presumably for diversion, while the USS *John Penn*, one of nine ships in the Kukumtetere vicinity, not counting screening destroyers, was singled out for less than 30 seconds of strafing and the single torpedo run which sank her.

'The first Jap plane, believed to be a "Kate" though identification was uncertain, was caught in the searchlights at 2040. It made a high run, dropping two flares from an estimated 15,000 ft, which landed close to shore off Kukum. Twenty minutes later, at 2100, two more flares were dropped, this time on land, and a considerable distance away. At 2122 the low-level attack was launched, possibly five planes taking part. The first two were engaged by destroyer fire while still some distance away, one off the starboard bow of the *Penn*, and one on the beam. The one off the bow crashed in the water, and the one on the beam came on, firing, and zoomed over the *Penn*.

'Moments later, on relative bearings of 090, 060 and 170 degrees, and coming in at approximately five-second intervals in that order, three more planes struck. The first, on the beam, was burning her running lights and firing pink tracers. The second, on a relative bearing of 060 degrees, launched a torpedo, dropping while an estimated 150 yards off. The third plane, approaching from 170 degrees, was hit by fire from the USS

An aerial view from a US Navy Vought OS2U Kingfisher floatplane of a downed IJNAF B5N2 sat in shallow water somewhere in the Southwest Pacific after being forced down in April 1944. American servicemen appear to be salvaging parts from the 'Kate's' engine (*US National Archives at College Park, MD, Still Pictures Branch*)

John Penn and crashed into the *Penn*'s mainmast at the same moment the torpedo struck in the starboard quarter.'

Despite efforts to save the ship, it sunk stern first at 2150 hrs. Some 35 survivors were rescued.

A handful of B5N2s also conducted a night attack on ships of Task Force (TF) 58 during Operation *Hailstone* – the US Navy's strike on Truk Atoll, in the Caroline Islands, on 17 February 1944. Following a full day of strikes by aircraft from no fewer than nine carriers that had seen US Navy F6F fighters claim an astonishing 124 aircraft shot down (including six 'Kates', although these were probably 'Jills'), the IJNAF mounted a retaliatory attack 30 minutes before sunset when six B5N2s were sent out against the carriers. Radar operators on board various ships in TF 58 detected the approaching formation an hour after the torpedo-bombers had taken off from Truk. The B5Ns were in turn radar-equipped – the first airborne sets to be encountered by US carriers – which meant that there was not the usual display of flares and float lights that usually heralded an attack by 'Kates' at night.

Two hours had passed before the B5N2s mounted anything like a threatening attack – earlier runs by single aircraft had been easily discouraged by turning the Task Force away to present the torpedo-bomber pilot with an unfavourable approach from astern. On two occasions the attacker had closed to within AA range before an F6F-3N of VF(N)-76B was launched from USS *Yorktown* (CV-10) to deal with a single B5N which had been circling at a distance of 40–45 miles for over an hour.

Twenty minutes after the nightfighter had taken off, the torpedo-bomber began to head for the Task Force, and *Enterprise*'s more experienced fighter direction team took control of the Hellcat, vectoring it towards the B5N as it slowly descended on its approach to TF 58. The Hellcat pilot briefly gained radar contact when both aircraft were about 20 miles from the screen, but contact was not regained and the B5N2 continued its low-level, slow-speed approach. The ships were ordered not to fire as the F6F-3N was still searching for the enemy aircraft, so the 'Kate' pilot only had to deal with the carriers' evasive manoeuvres.

Just as *Intrepid* turned hard to avoid the attack it was hit right aft on the starboard side. The 'Kate' that made the attack escaped in the darkness back

to Truk. The carrier was still capable of making 25 knots, but its rudder was jammed hard over – only by running the two screws on the other side at near-maximum revolutions could the ship maintain a straight course. Eleven men were killed and several more wounded. Within two hours of the attack *Intrepid* had been detached to proceed to Eniwetok, covered on passage by the light carrier USS *Cabot* (CVL-28), two cruisers and four destroyers.

'KATES' IN OTHER ROLES

As the Pacific War raged on, the B5N2's weaknesses – inadequate armour protection for its aircrews and no self-sealing fuel tanks – became more apparent, particularly when pitted in combat against the new generation of US Navy fighters such as the F6F Hellcat and F4U Corsair. Consequently, a number of the surviving 'Kates' were relegated to training, target-towing and anti-submarine warfare (ASW) duties. The training role was handled primarily by the Usa *Kokutai*, which received war-weary B5N2s to supplement its B5N1-Ks – an advanced trainer developed by Nakajima from the B5N1 once that variant had been replaced by the -2 in frontline units.

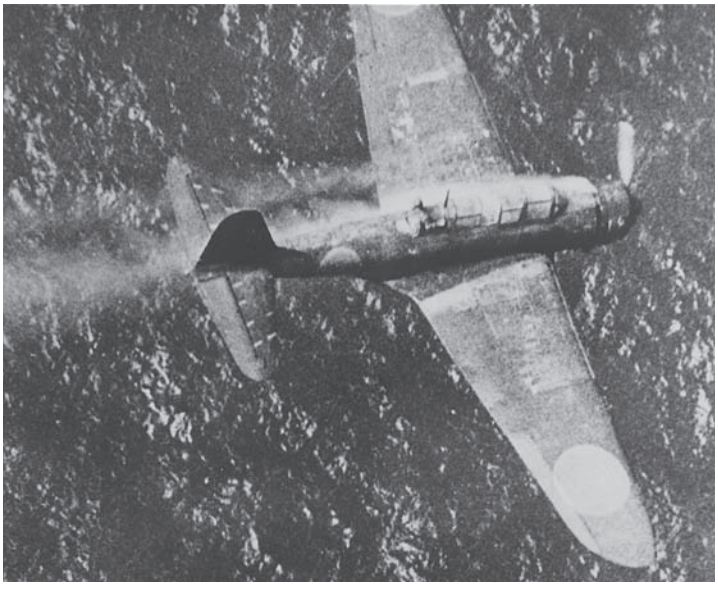
Usually flying from land bases in areas where Allied fighters were rarely found, B5N2s were widely used for maritime reconnaissance and ASW from late 1942 onwards thanks to the aeroplane's long endurance. With Japanese merchant ships increasingly falling victim to marauding Allied submarines, 'Kates' flying from escort carriers such as *Kaiyo* proved critically important in providing convoys sailing between Japan and its occupied territories in southeast Asia (particularly Singapore and the Philippines) with a modicum of air cover.

Initially, crews had to rely on visual reconnaissance only in the detection of submarines, but as the war progressed air-to-surface vessel radar became available – 'Kates' fitted with this equipment boasted aerials along the rear fuselage sides and the wing leading edges. A small number of aeroplanes received Jikitanchi Magnetic Airborne submarine Detection (MAD) equipment, but the results achieved with it were poor unless the 'Kate' flew at 30–40 ft above the surface of the water. Armament for the ASW mission consisted of standard Navy Type 99 Model 6 Mark 2 60 kg and Type 1 Model 25 Mark 2 250 kg aerial bombs fitted with delayed-action time fuses.

One of the earliest ASW successes enjoyed by the 'Kate' came on 21 April 1943 when the *Tambor*-class submarine USS *Grenadier* (SS-210) was sunk. The official US Navy combat report into the incident read as follows;

'While operating off the Malay Peninsula during her sixth war patrol, *Grenadier* sustained heavy damage to

While on an ASW patrol near the Caroline Islands and the mighty IJN fortress of Truk, this late-war B5N2 fell victim to a US Navy Consolidated PB4Y-1 Liberator of VB-109 on 6 June 1944. The PB4Y-1's port waist gunner killed the 'Kate's' rear gunner after opening fire at a range of less than 300 ft. The B5N2 crashed into the water and exploded simultaneously with the release of its depth bombs. This brief combat over the open ocean lasted no longer than six minutes (*US National Archives at College Park, MD, Still Pictures Branch*)



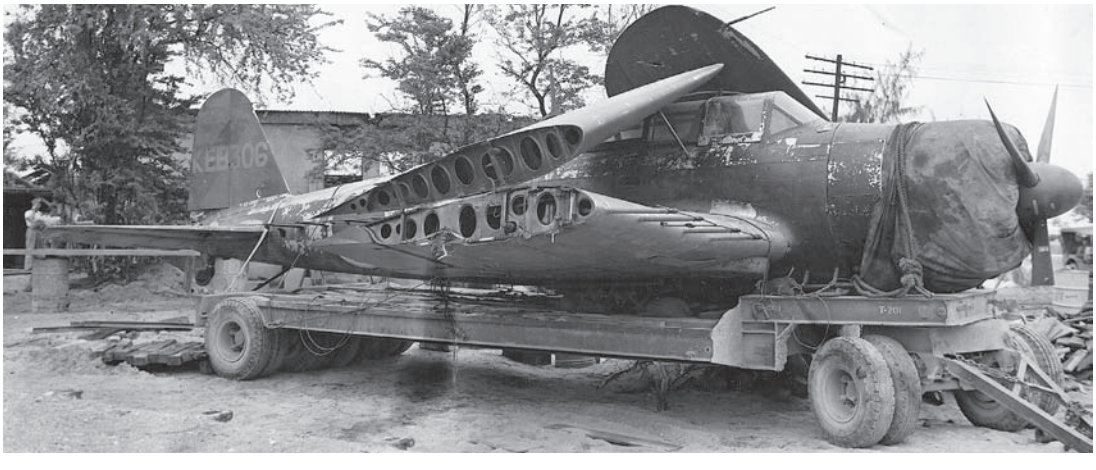
A close-up of the heavily damaged B5N2 seen in the previous photograph, showing the dead gunner slumped over the edge of the rear cockpit (*US National Archives at College Park, MD, Still Pictures Branch*)

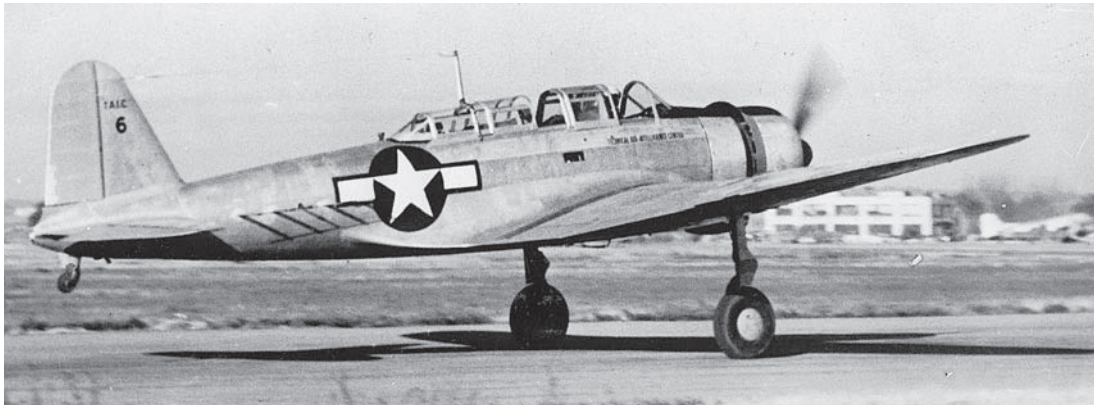
the after portion of the ship as the result of a Japanese aircraft depth bomb attack. The most serious casualty which occurred, and which directly caused *Grenadier*'s loss, was the complete immobilisation of her propulsion plant due to derangement of the main control cubicle and severe misalignment of the propeller shafting. All efforts by the ship's crew to effect emergency repairs were unsuccessful. Early the next morning *Grenadier* was abandoned and scuttled by her own crew to prevent imminent capture by an approaching Japanese merchant ship.'

The submarine had been in pursuit of two Japanese merchant ships when it was detected by the lone 'Kate'. Although *Grenadier*'s crew made a quick dive, a depth charge dropped by the aeroplane detonated close over the ship as it was passing a depth of 120 ft. According to the combat report, 'The severity and extent of the damage indicate that the weapon was probably a 250 kg Mark 2 anti-submarine depth bomb containing 317 lb of Type 98 explosive. This is the largest depth bomb known to have been developed by the Japanese, and was commonly used for anti-submarine work.'

Another submarine that fell victim to the B5N2 was USS *Grayback* (SS-208), the *Tambor*-class ship being sunk in the East China Sea on 27 February 1944 by an aeroplane flying from Oroku, on Okinawa. The submarine, which was on its tenth war patrol, had just used its final torpedoes to sink the freighter *Ceylon Maru* (*Grayback*'s 14th success) when it was spotted on the surface by a lone 'Kate'. According to Japanese reports the submarine 'exploded and sank immediately' when bombed by the B5N2, although ASW ships depth-charged the area until a heavy oil slick reached the surface. There were no survivors.

This aircraft from 931st Kokutai was captured on Saipan's Aslito airfield following the seizure of the island in July 1944 after more than three weeks of bloody fighting. Built in December 1943 and equipped with air-to-surface vessel radar (note the anti-shipping radar antennae arrays at various locations on the aircraft), it is seen here being prepared for shipping back to San Diego, California, aboard USS *Copahee* (CVE-12), along with 13 Zero-sens and 37 Japanese aero engines (*US National Archives at College Park, MD, Still Pictures Branch*)





OPERATION *RO-GO*

Throughout 1943 Anglo-American forces had steadily moved up the Solomon Islands chain, with the ultimate objective of destroying the Japanese air and naval stronghold at Rabaul and thus break the enemy's hold on the Bismarck Archipelago off the northeastern coast of New Guinea.

In the early autumn the Joint Chiefs of Staff approved Vice Admiral William Halsey's plan to establish airfields on the island of Bougainville that would bring Rabaul within range of Allied fighters and medium bombers. Halsey's planning staff duly decided to capture an isolated section of the west coast of Bougainville at Cape Torokina, in Empress Augusta Bay, and scheduled the invasion for 1 November 1943.

The US Navy's growing strength in the Central Pacific and Allied progress up the Solomons presented Japan's Imperial Headquarters with a dilemma. How and where were the IJN to defend against the next Allied attack? In late September 1943 Imperial Headquarters issued its 'New Operational Policy', which called for a determined defence of all Japanese positions so as to gain time to rebuild before taking the offensive in 1944. Holding Rabaul was vital to this defensive policy. The IJN still hoped to engage the US Pacific Fleet in a decisive battle, and had moved the Combined Fleet out of its anchorage at Truk following the 5 October raid on Wake Island in the hope of engaging TF 14 in battle. However, when no invasion of Wake followed, the Combined Fleet returned to Truk.

Instead, Admiral Mineichi Koga, Commander-in-Chief of the Combined Fleet, decided to strip his carrier fleet of its entire air strength so as to reinforce 11th Koku Kantai (Air Fleet) on Rabaul as part of Operation *Ro-Go* – the disastrous attack on US naval forces in the Solomons in an attempt to halt Allied air strikes on Rabaul. At the end of October the air groups of 1st Koku Sentai – 82 Zero-sens, 45 'Vals', 40 'Kates' and six 'Judys' – from the carriers *Zuikaku, Shokaku* and *Zuiho* moved to Rabaul to join approximately 200 IJNAF aircraft already stationed there. 1st Koku

Top: Overhauled, the Saipan B5N2 flew for the first time in American hands on 16 November 1944 from NAS Anacostia, in Washington, D.C.. Early test flights evaluated the performance of the radar equipment during sorties against vessels sailing off the Delaware coast, the equipment being operated by an experienced radar technician from the Naval Radio Laboratory. The US Navy tallied 35.9 hours of test and evaluation flying in the aeroplane through to the end of April 1945 (*US National Archives at College Park, MD, Still Pictures Branch*)

Bottom: Once the Technical Air Intelligence Center had finished evaluating the Saipan 'Kate' in October 1945, both it and a surplus A6M5 'Zeke' were attached to a unit known as 'The Navy's Flying Might'. It was set up as a travelling display to take part in nationwide Victory Loan promotions across the USA, and both the 'Kate' and 'Zeke' were painted in a suitable shade of green and given Japanese roundels in order to better represent enemy aeroplanes in the aerial displays performed by 'The Navy's Flying Might'. The B5N2 served with the unit into 1946, and its final fate remains unrecorded (*US National Archives at College Park, MD, Still Pictures Branch*)

Sentai arrived in Rabaul on 1 November 1943 – the day American forces invaded Bougainville.

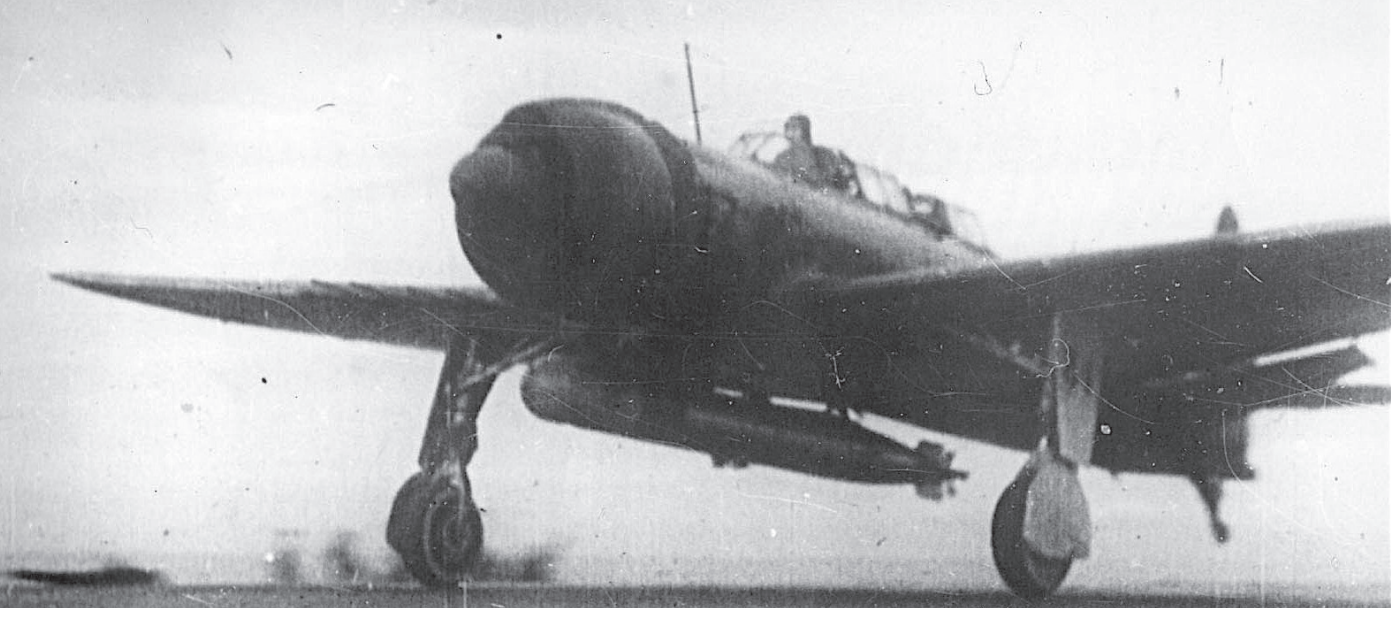
On 5 November 14 'Kates', with an escort of only four Zero-sens, attacked the US fleet south of Bougainville. As was often the case in the latter stages of the Pacific War, Japanese claims were wildly exaggerated. On this occasion the B5N2 crews stated that they had sunk one large carrier, two small carriers, two large cruisers and two small cruisers or large destroyers. Four 'Kates' were lost. In reality, the torpedo-bombers had attacked two large landing ships (presumably the 'carriers') escorted by one 'gunship', and all three survived the attack. By the time the Japanese force returned to Rabaul, eight 'Kates' had been lost to AA fire or enemy fighters.

Six days later Task Group (TG) 50.3, which included the fleet carriers USS *Essex* (CV-9), USS *Bunker Hill* (CV-17) and the light carrier USS *Independence* (CVL-22), rendezvoused with TF 38's *Saratoga* and the light carrier USS *Princeton* (CVL-23) and commenced strikes on Rabaul from 0645 hrs. During the course of the morning numerous IJNAF fighters were shot down and ships attacked in Rabaul harbour.

The Japanese High Command on Rabaul had recognised immediately that the American dive- and torpedo-bombers conducting the strikes could only have come from aircraft carriers, and so prepared a counter-attack against the task force. 1st Koku Sentai sortied 27 'Val' dive-bombers and 14 'Kate' torpedo-bombers, with an escort of 33 Zero-sen fighters. The formation was possibly accompanied by several 'Judy' carrier reconnaissance aircraft too. An additional 32 Zero-sens from 253rd Kokutai were also despatched as escorts, but they failed to find the target and returned to Rabaul.

The Japanese attack came in four waves, the first at 1356 hrs from an estimated 32 'Vals' against all three of TG 50.3's carriers. Two minutes later a second wave of nine 'Vals' went after *Bunker Hill*. Then at 1403 hrs the first group of 'Kates' came in, apparently with several G4M 'Betty' bombers, quickly followed by another B5N2 formation. The 'Vals' completed their attacks before the defending fighters could reach them, but fortunately without damaging any of the carriers. The Hellcats intercepted the 'Kates' beyond TG 50.3's destroyer screen, however, disrupting their attack. In the confused combat that followed, the US Navy pilots claimed 137 Japanese aeroplanes shot down – considerably more than actually participated in the attack. Regardless of the precise number shot down, Japanese losses were heavy. 1st Koku Sentai alone appears to have had 17 of its 'Val' dive-bombers destroyed, as well as all 14 of its 'Kate' torpedo-bombers and two Zero-sens, and they failed to inflict any damage on the American carriers.

Just 52 of the 173 1st Koku Sentai aircraft sent to defend Rabaul survived combat and returned to Truk on 13 November. Only six B5N2s from the original force of 40 were amongst their number.

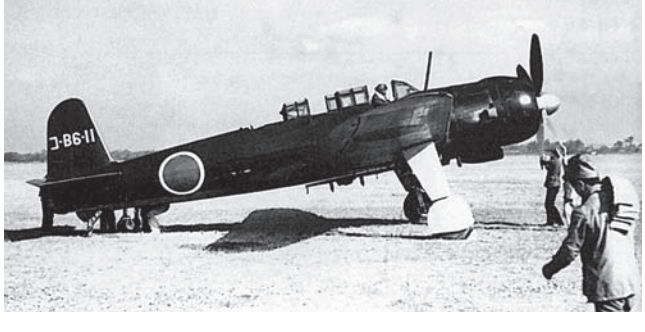


CHAPTER FOUR

B6N 'JILL' AND THE KAMIKAZE

The Imperial Naval Staff had issued a request for a replacement for the B5N as early as 1939 with the release of the 14Shi specification. This called for a three-seat carrier-borne torpedo-bomber with a top speed of 288 mph and a range of 1151 miles with an 800 kg bomb load. The new aeroplane, designed by Kenichi Matsumura and designated the B6N by the IJNAF, was aerodynamically similar to the B5N, but its Nakajima NK7A Mamoru 11 14-cylinder air-cooled radial engine produced 1870 hp – 80 per cent more than the Sakae 11 in the 'Kate'.

Constrained by carrier stowage restrictions, Matsumura was forced to use a wing that was similar to the B5N's in both span and area, despite his new aircraft, called the Tenzan ('Heavenly Mountain'), being considerably heavier than the 'Kate'. This meant that the B6N would suffer from a high landing speed and wing loading, restricting its fleet use to larger carriers. One of the aeroplane's key external features was its forward-swept vertical tail surfaces, which were adopted in order to keep the aircraft's length within the limits imposed by the IJNAF to ensure that the B6N could be accommodated on carrier elevators.



An IJNAF pilot and groundcrewman prepare to start the engine of a brand new B6N2 in readiness for a test flight at the Kaigun Koku Gijutsusho (Naval Air Technical Arsenal). The aeroplane is fitted with an empty underfuselage stores rack and has yet to have 7.7 mm Type 92 machine guns installed in either the rear cockpit or the ventral tunnel position (*www.ijnafpics.com, PD-Japan-oldphoto*)

Left: A B6N2 equipped with 3-Shiki Type 3 air-to-surface vessel radar and armed with a Type 91 aerial torpedo (offset to the right of the aircraft's centreline, so as not to interfere with the large engine oil cooler offset to the left) takes off from an IJN carrier during training leading up to the First Battle of the Philippine Sea on 19 June 1944. A total of 57 'Jills', flying from nine carriers, were involved in what ultimately resulted in yet another defeat for the Japanese that would signal the end of the IJNAF as an effective fighting force (*Alamy, D44CJ3*)

The IJNAF also insisted that the aeroplane should be powered by the proven Mitsubishi MK4T Kasai 25 engine, rated at 1850 hp, but Matsumura stuck with the new Mamoru 11 because of its lower fuel consumption and room for growth. Flight testing commenced in the spring of 1941, whereupon it was soon found that the design was plagued by serious engineering flaws – including directional stability issues caused by the powerful torque of the aeroplane's four-bladed propeller. To solve the latter, Matsumura had to move the vertical tail surfaces two degrees to the left. Teething troubles with the Mamoru 11 engine also delayed the test programme, which meant that the B6N was not deemed ready for carrier acceptance trials until late 1942. When these eventually took place aboard *Ryuho* and *Zuikaku*, the aeroplane's arrestor hook proved to be too weak and several landing mishaps occurred as a result.

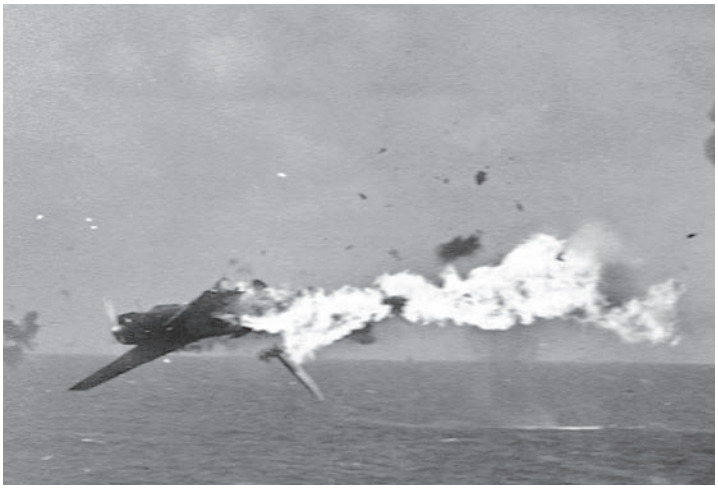
The Tenzan was finally accepted for production in February 1943, with the B6N1 introducing a number of modifications to make the aeroplane suitable for fleet use. These included smaller exhaust stacks, angling down of the torpedo rack, strengthening of the main landing gear attachment and tailplane and fitment of a flexible 7.7 mm machine gun firing through a ventral tunnel.

After production of just 133 B6N1s through to July 1943, Nakajima was instructed by the Ministry of Munitions to cease production of the Mamoru 11 to allow the company to concentrate on building the more widely used Sakae and Homare engines. Fitted with the Mitsubishi MK4T Kasai 25 rated at 1850 hp, the re-engined Tenzan was designated the B6N2. A total of 1133 B6N2s would be completed by Nakajima between June 1943 and August 1945.

B6Ns INTO THE FRONTLINE

The IJNAF had planned for its carrier air groups to gradually transition from the B5N to the B6N from the autumn of 1943. However, the first frontline unit issued with 'Jills' was land-based 531st Kokutai, activated on 1 July 1943 at Tateyama, in Japan. It is not clear precisely when the first examples were received by the unit, although it is highly likely that B6N1s began to arrive during August. A detachment was sent to the northern Kurils in September 1943, and where it was engaged in patrols but saw no combat. Twelve of its B6Ns were also sent to Kavieng in mid-November to reinforce IJNAF units in the Rabaul area (after the formal end of Operation *Ro-Go*) and they were absorbed into 582nd Kokutai. It was with the latter unit that the 'Jill' first saw combat when six examples took part in attacks on US Navy vessels off Bougainville on 3 December 1943. Aside from its dwindling force of 'Val' dive-bombers,

A land-based B6N1 from 531st Kokutai suffers a direct hit by a five-inch shell fired from USS *Yorktown* (CV-10) during an unsuccessful torpedo attack on the carrier off Kwajalein on 4 December 1943. 531st Kokutai was the first frontline unit to be issued with 'Jills', examples arriving during August 1943 (*US National Archives at College Park, MD, Still Pictures Branch*)



582nd Kokutai operated a mixture of 'Kates' and 'Jills' at this time. The few B6Ns on hand, however, were soon expended on operations over the following weeks.

Meanwhile, the main body of 531st Kokutai deployed to the Marshall Islands from Japan during December 1943, and was based primarily at Kwajalein, with flights also operating from Wotje and Mili. The unit's 'Jills' did fly some combat sorties against US warships off the Gilberts during early December 1943 following enemy landings at Makin and Tarawa the previous month, but the entire unit was annihilated when US forces later landed on Kwajalein between 31 January and 3 February 1944. 531st Kokutai was officially stricken from the books on 20 February 1944.

This B6N1 from 531st Kokutai was also shot down after making an unsuccessful torpedo attack on *Yorktown* on 4 December 1943 during the Marshall Islands campaign (*Time Life Pictures/US Navy/The Life Picture Collection/Getty Images*)

Meanwhile, 551st Kokutai became the second unit to receive B6Ns when it was formed at Singapore on 1 September 1943 from the attack aeroplane component of 331st Kokutai. 551st Kokutai operated a mixed force of 'Kates' and 'Jills' in the Dutch East Indies and over the Bay of Bengal. The B6N component – totalling 26 aircraft – was eventually transferred to Truk, in the Caroline Islands, on board the escort carrier *Kaiyo*. The vessel arrived there on 11 February 1944, and the aircraft were sent to the airfield at Param Island. Six days later the 551st suffered crippling losses during the US Navy carrier raid (codenamed Operation *Hailstone*) on Truk, no fewer than 18 of these aeroplanes being destroyed on the ground. A handful of torpedo-bombers did mount some counter-attacks against the carrier task force but they were quickly despatched – the American pilots involved identified their targets as 'Kates'.

551st Kokutai was eventually reconstituted and took part in the Battle of the Philippine Sea from land bases, but it was decimated in this action and deactivated on 10 July 1944.

Finally, 553rd Kokutai, originally formed on 20 February 1944, also operated both 'Kates' and 'Jills' in the Kurils from late April 1944 until it was transferred to the Philippines at the beginning of October, leaving a small rear echelon of four B5Ns and a solitary B6N that was folded into Hokuto (Northeast) Kokutai and continued operating in the Kurils. The sole 'Jill' was subsequently lost to operational causes.

With the IJNAF's fighting strength significantly reduced following the attacks on Rabaul and

Despite intense AA fire, the determined pilot of this B6N2 (probably from 551st Kokutai) presses home a torpedo attack against *Yorktown* on 29 April 1944 during the US Navy's two-day aerial assault on Truk Atoll, in the Caroline Islands – the last time the previously vital Japanese base was targeted in World War 2. The pilot failed to release his weapon and passed over the bow of *Yorktown* before crashing into the sea (*US National Archives at College Park, MD, Still Pictures Branch*)

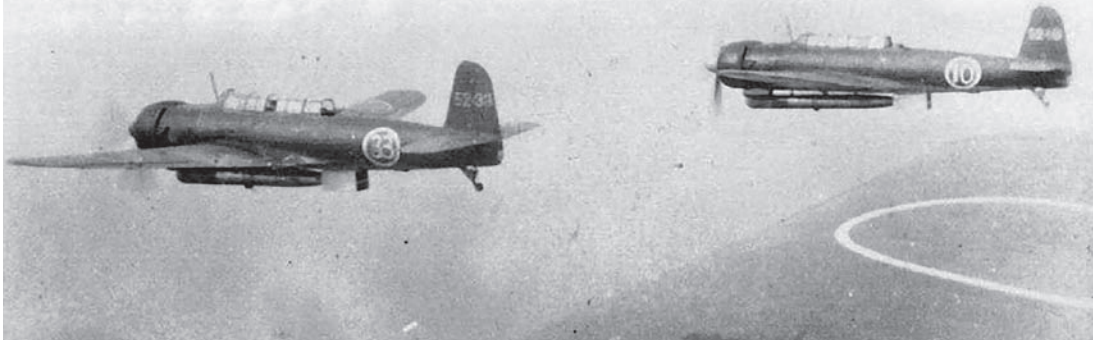
A second 'Jill' attempting a torpedo attack on *Yorktown* on 29 April 1944 is hit by the carrier's AA fire and trails flames and smoke – the aeroplane's hydraulics have also failed, allowing its undercarriage to drop down. Shortly after this photograph was taken the aircraft spiralled into the ocean (*US National Archives at College Park, MD, Still Pictures Branch*)

Torpedo-armed B6N2s from 752nd Kokutai formate in flight during the spring of 1944. Note the Kyoban wooden aerodynamic box-type stabiliser plates fitted to the tails of the Type 91 aerial torpedoes. These were created to stabilise the up-and-down motion of the torpedo in the air, keeping it aligned to its diving course prior to entering the water. Flying from Toyohashi airfield, a part of 752nd Kokutai was charged with training B6N aircrew destined for frontline operations. Towards the end of the war numerous IJNAF aircraft flying in Japan had their individual identification numbers applied in white chalk to their national markings, as seen here (*www.ijnafpics.com, PD-Japan-oldphoto*)

Truk, the Japanese High Command realised that it had to try to protect its remaining naval aircraft in an attempt to stall the Allied advance. Following months of operating from shore bases, the IJNAF's air groups would finally re-embark aboard the carriers of First Mobile Fleet in the late spring of 1944 when the IJN chose to take a stand in the First Battle of the Philippine Sea. This clash, fought off the Mariana Islands chain, in the central Pacific, on 19–20 June, would ultimately result in yet another defeat for the Japanese and signal the end of the IJNAF as an effective fighting force.

Immediately prior to the First Battle of the Philippine Sea, US carrier aircraft launched strikes on IJNAF airfields in the Marianas, Iwo Jima and Chichi Jima for six days from 11 June. Trying to strike back, a handful of land-based 'Kates' and 'Jills' (as many as 40 B6Ns had been flown to airfields in the Marianas from Peleliu along with other IJNAF reinforcements) attempted dusk or dawn torpedo attacks on the American carriers on the 15th, 17th and 18th without success. Three B5N2s and six B6N2s fell to FM-2 Wildcats of VC-4 and VC-68 flying CAP from escort carriers. It appears that the only success enjoyed by land-based torpedo-bombers (of 551st Kokutai) was the destruction of the 400-ton troop-carrying Landing Craft Infantry amphibious assault ship LCI(G)-468 during a dusk attack by five B6N2s on 17 June – three of the 'Jills' were downed by AA fire from the remaining landing craft east of Saipan.

How many 'Kates' subsequently participated in the actual carrier battle on 19-20 June is open to speculation, as B6N2s were flying with a number of air groups by then. According to IJNAF records, in May 1944 601st Kokutai (Air Group) assigned to the First Koku Sentai (embarked in *Shokaku*, *Zuikaku* and *Taiho*) had 227 aeroplanes on strength, including 56 B6N2s; 652nd Kokutai of the Second Koku Sentai (embarked in *Hiyo*, *Junyo* and *Ryuho*) had 135 aircraft assigned (of which 18 were B6N2s); and 653rd Kokutai of the Third Koku Sentai (embarked in *Chitose*, *Chiyoda* and *Zuiho*) had 90 aeroplanes (of which 27 were B5N2s and B6N2s).



First Mobile Force sailed from its Tawi-Tawi anchorage, on the northeast coast of Borneo, on 13 June to engage the Pacific Fleet off the Marianas. Before dawn on the 19th, Vice Admiral Jisaburo Ozawa, commanding First Mobile Fleet, launched search aircraft that eventually spotted US carriers 280 nautical miles from the Third Koku Sentai. At 0830 hrs, the Japanese carriers began to launch a first strike force composed of three waves. *Taiho*, *Shokaku* and *Zuikaku* despatched 48 Zero-sens, 53 'Judys' and 27 'Jills' between them; *Junyo*, *Hiyo* and *Ryuho* launched 16 Zero-sens, seven 'Judys' and 26 'Jills'; and *Chitose*, *Chiyoda* and *Zuiho* contributed 14 Zero-sens, 28 'Judys' and 26 'Jills' to this first strike.

A B6N2 'Jill' fitted with 3-Shiki Type 3 air-to-surface vessel radar – note the Yagi antennae arrays on the side of the rear fuselage and wing leading edge. This equipment was identical to that fitted to the B5N2 from 1943, allowing these aeroplanes to target submarines and surface vessels day or night. Note that the aircraft's Fowler flaps in the wing's trailing edge have been extended. These were fitted to the B6N in an effort to offset the increased wingloading caused by the weight of the 'Jill's' powerplant. The flaps were normally lowered to an angle of 20 degrees during takeoff and 38 degrees when landing. Despite the use of these flaps, the B6N still had a much higher stall speed than the B5N (*Kingendai/AFLO, JMQA006803*)

Despite this being the largest number of carrier-based aircraft sent against the US Pacific Fleet in a carrier-versus-carrier action, the effectiveness of American radar meant that the Japanese aeroplanes were engaged by Hellcats well before they reached their target. Furthermore, the inexperience of the crews manning the IJNAF aircraft meant they would suffer horrendous losses at the hands of the US Navy fighter pilots. Of the 200+ aeroplanes despatched in the first strike, fewer than 50 made it through the Hellcat screen. Faced by intense AA fire, the aircraft only managed to register single hits on the battleships USS *Indiana* (BB-58) and *South Dakota*.

Additional strikes were sent out during the course of the morning, with the Second Koku Sentai launching 20 Zero-sens, 36 'Judys' and 26 'Jills' at 1000 hrs. By then *Taiho* had suffered a mortal torpedo hit after being targeted by USS *Cavalla* (SS-244), the latter subsequently striking *Shokaku* twice at 1122 hrs. *Shokaku* sunk some two-and-a-half hours later, taking 1272 sailors and nine aircraft (including two 'Jills') with it, whilst *Taiho* was wracked by a series of explosions caused by igniting avgas vapour shortly thereafter. This reduced the strength of the First Koku Sentai to a single carrier, *Zuikaku*, which launched just eight aircraft in a follow-up strike at 1020 hrs. This ship also recovered the few surviving aircraft from the first strike launched by *Taiho* and *Shokaku*. No aeroplanes from the follow-up strikes (including 47 aircraft, seven of them B6N2s, from the Second Koku Sentai) reached the US fleet, the fighter CAP and the ships' deadly AA screen exacting a heavy toll.

With First Mobile Fleet still out of range of US carrier aircraft, but now shorn of two carriers and 244 aeroplanes of the 374 launched in four strikes, the IJN ordered its withdrawal to Nakagusuku Bay, off Okinawa. The ships' departure westward was delayed, however, by the need to slow down in order to refuel at sea during the morning of 20 June. This gave TF 58 the chance to catch up with the retreating Japanese ships and launch a solitary strike, which attacked the carriers at dusk. The incoming aircraft were detected approaching from the east at 1740 hrs,

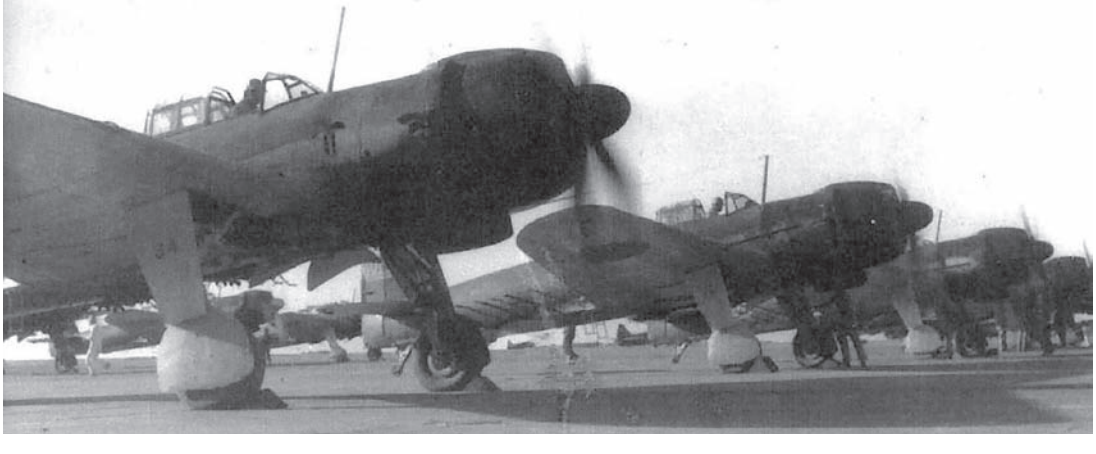
at which point *Hiyo* swung out to launch two B6N2s that were tasked with laying a smokescreen to hide the fleet. This manoeuvre caused the carrier to fall almost four miles behind *Junyo* and other ships within First Mobile Fleet, leaving it vulnerable to attack. At 1745 hrs enemy dive- and torpedo-bombers appeared overhead and made a coordinated attack, *Hiyo* being hit by a single bomb and a torpedo. It eventually sank at 1932 hrs. The carriers *Chiyoda*, *Junyo* and *Zuikaku* were also hit, with the latter two suffering significant damage.

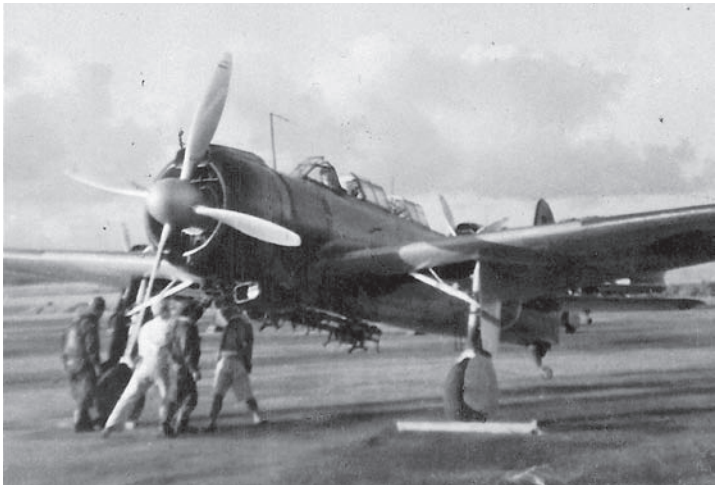
The First Battle of the Philippine Sea had been a total disaster for the IJN, which had lost three carriers, 433 carrier aircraft and around 200 land-based aeroplanes. US Navy fighter pilots had claimed 422 aerial victories during the battle (dubbed the 'Great Marianas Turkey Shoot' by the naval aviators involved), of which 44 were identified as 'Jills' or 'Kates'. Having spent a year rebuilding its carrier air groups, the IJNAF had lost 90 per cent of its aircraft in just two days.

With the threat of First Mobile Fleet now neutralised, TF 58 continued on its offensive in the central Pacific. Amongst the first targets it attacked following the Marianas clash was Iwo Jima on 24 June. A further 116 IJNAF aircraft were claimed as destroyed on this date, including no fewer than 29 'Kates' (probably 'Jills') sent out in two waves to attack the US carriers. Both strikes were clinically dealt with by the Hellcat CAP – predominantly from VF-2, flying from USS *Hornet* (CV-12). The first wave was attacked 70 miles from TF 58 at 1000 hrs and the second engaged at 1735 hrs. Although the latter aeroplanes also had a Zero-sen fighter escort, none of them got within sight of the American carriers.

The IJN's final carrier action occurred in October 1944 during the Second Battle of the Philippine Sea, also known as the Battle of Leyte Gulf. With the IJNAF having struggled to make good the grievous losses it had suffered off the Marianas four months earlier, this clash was almost a non-battle. In theory, the four carriers of First Mobile Force could embark a total of 230 aircraft, but a lack of aeroplanes (most of the assigned air groups had been sent to Formosa earlier in October to support land-based units) and suitably qualified pilots meant that *Zuikaku*, *Zuiho*, *Chitose* and *Chiyoda* sailed with only 116 aircraft embarked – including 25 B6N2s and four B5N2s.

A conventional B6N2 has its engine run up alongside two radar-equipped 'Jills'. These aeroplanes may be from Himeji Kokutai, which flew a mixed force of B6Ns on myriad ASW missions off southwestern Japan from Kushira airfield, on the southern tip of Kagoshima prefecture, in 1944-45. Starting from the autumn of 1943, one in every three B6N2s manufactured was equipped with 3-Shiki Type 3 radar (*www.ijnafpics.com, PD-Japan-oldphoto*)





A B6N2 Tenzan (codenamed 'Jill' by the Allies) is serviced by groundcrewmen at an airfield on Saipan circa 1944. The 'Jill' slowly replaced the B5N 'Kate' as the IJNAF's premier carrier-borne torpedo-bomber from late 1943 (*US National Archives at College Park, MD, Still Pictures Branch*)

Unlike in previous carrier clashes, where the IJN's once formidable 'flattops' had been Japan's premier maritime weapon, Vice Admiral Jisaburo Ozawa's First Mobile Force was to act primarily as a decoy for US carrier aircraft of the Third and Seventh Fleets whilst nine battleships, 20 cruisers and more than 35 destroyers targeted the American invasion fleet in Leyte Gulf – troops had come ashore on 17 October. This action was part of the overall *Sho No 1* ('Victory 1') plan devised by the IJN to oppose the impending US landings in the Philippines. As with the elaborate plan that went so spectacularly wrong during the ill-fated defence of the Marianas, *Sho No 1* was undone by pre-emptive strikes by US carrier aircraft on airfields on Formosa, which were home to Japan's primary source of air support for the defence of the Philippines.

Although more than 400 aircraft (from both the JAAF and IJNAF) were claimed as shot down during ten days of carrier strikes from 10 October, the relatively few B6N2s on Formosa struck back with dawn and dusk torpedo attacks that crippled the cruisers USS *Canberra* (CA-70) on the 12th and its replacement in TG 38.2, USS *Houston* (CL-81), the following day. Canberra had been hit below its armour belt, exposing its engineering spaces to the ocean and stalling the ship's steam turbines. *Houston* also received serious damage to its powerplants when a torpedo struck the ship's engine room. Four 'Jills' had targeted the ship, and three of them had been downed by *Houston*'s gunners.

Both cruisers were taken under tow towards the Pacific Fleet anchorage at Ulithi, and during the late afternoon of 16 October they were attacked once again by B6N2s from Formosa. Although no fewer than 20 'Jills' and a solitary 'Kate' were credited to F6F pilots from VF-22 and VF-29 that were defending *Canberra* and *Houston*, the latter ship was struck in the stern by another torpedo. Nevertheless, *Houston* was kept afloat and eventually repaired.

This lone land-based B6N2 was photographed just as the pilot launched his torpedo during a dusk attack on USS *Essex* (CV-9) on 14 October 1944 on the eve of the Battle of Leyte Gulf. The weapon, visible between the aeroplane and the water, ultimately missed its target and the 'Jill' fell victim to the carrier's intense AA fire (*US National Archives at College Park, MD, Still Pictures Branch*)

These attacks were made possible following the introduction of new tactics by 'Kate' and 'Jill' crews during 1944, as noted in an ONI report detailing operations against Formosa, the Ryukyus and the Philippines in October–November 1944;

'The late, twilight aircraft torpedo attacks on 13 and 14 October showed that the enemy had studied our defence and learned that we

were vulnerable during twilight to low-flying torpedo attacks. By snooping through the later afternoon he closely fixed our positions. Such snooping usually cost him most or all of the snoopers involved, but the results were worth it. The torpedo attack unit was then sent out to attack low on the water from the east, so as to silhouette the force against the last bit of remaining light.'

On the day attacks on Formosa finally came to an end (20 October), Ozawa's First Mobile Force departed Japan for the Philippines as part of *Sho No 1*. The bulk of the IJN's battleships and cruisers left Brunei two days later. Heading for the east coast of Luzon, Ozawa despatched B6N2 reconnaissance flights on 21 and 22 October in search of the US carriers, losing three aeroplanes on both days due to the insufficient training of their crews – no enemy aircraft were encountered, they simply ran out of fuel after becoming lost. Indeed, no American ships were sighted until the 24th.

That morning, at 1145 hrs, *Zuiho*, *Chitose* and *Chiyoda* of First Mobile Force launched 53 aircraft (including just four B6N2s) on what proved to be virtually a suicide mission. Heading south, the IJNAF aeroplanes were quickly intercepted by Hellcats and virtually all of them shot down. The few survivors flew back to Clark Field, near Manila, as instructed by Ozawa prior to their departure. At 1155 hrs *Zuikaku* launched 29 aircraft (including six B6N2s) in the last offensive strike generated by a Japanese carrier. Aided by intermittent cloud cover, only 14 of these aeroplanes were lost to enemy action. After conducting a desultory attack on US ships, the survivors landed back at Clark Field – 34 aircraft from First Mobile Force were now here. US Navy fighter units had claimed 270 victories (including land-based aeroplanes from both the IJNAF and JAAF) on 24 October, of which 14 were 'Jills' or 'Kates'.

The following day, Ozawa transferred most of his remaining aircraft to bases in the Philippines, although not before he had despatched four B6N2s at 0555 hrs in search of the American fleet. Lacking any fighter CAP, all four carriers of the First Mobile Force had been sunk by US Navy dive- and torpedo-bombers by mid-afternoon.

KAMIKAZES

The ineffectiveness of conventional air attacks on US Navy surface ships, particularly heavily defended targets like carrier task groups, forced the Japanese to re-evaluate their tactics in late 1944. The solution they arrived at was simple – crash their aircraft into Allied ships. This notion of self-sacrifice fitted well within the Japanese warrior psyche and proved terrifying to the Allied sailors subjected to it. These tactics brought immediate results, and proved effective until the end of the war. The US Navy in particular was forced to adapt its tactics and operations and deploy new weapons to counter the threat.

While American defences destroyed most kamikazes before they had a chance to strike a ship, the cost was very high. More than 400 ships and craft were struck by kamikazes, of which 60 were sunk. Personnel casualties were also horrendous, with 6805 killed and 9923 wounded. For the Japanese the cost was also high, and in the end the kamikazes caused massive carnage but were unsuccessful.

An obsolete B5N1 hastily pulled from a training unit departs from an undisclosed airfield at the start of its final flight – a special attack mission against a US aircraft carrier task force off Okinawa in the spring of 1945. Being slow, especially when armed with a torpedo, and not overly agile, the 'Kate' was not well suited to the role of kamikaze aircraft. Indeed, officially at least, the aeroplane's first dedicated special attack mission occurred as late as April 1945 (*Kingendai/AFLO, JMQA001361*)

Although a policy of deliberately crashing aircraft into the target was not adopted until late 1944, there were documented instances before then of Japanese pilots targeting US Navy ships with their aircraft. Sometimes this was the result of a pilot deciding to do the maximum amount of damage with a damaged aircraft, and on other occasions it appeared to be deliberate from the start. The Battle of Santa Cruz on 26 October 1942 provides an early example. The carrier *Hornet* was the target of concerted IJNAF air attack. The ship was heavily damaged, and part of the carnage was caused by a 'Val' that crashed into the island and a 'Kate' that struck the bow. In both instances, the aircraft were damaged during the attack and their pilots made the choice to expend themselves against the carrier. Of note, the damage caused by these aircraft was light, but the carrier was hit by two torpedoes during the attack which eventually led to its loss. Another 'Kate', also damaged, flew into the destroyer *Smith*, escorting *Enterprise*, and created a large fire that killed 57 sailors.

These suicide attacks were very much the exception to the rule during the early stages of the conflict in the Pacific, however. At the start of the war, the IJNAF's pilots were the best trained naval aviators in the world. The carrier pilots were the cream of the crop, and showed themselves to be formidable adversaries. From Pearl Harbor to the Indian Ocean and then in the carrier battles of Coral Sea and Midway, they were renowned for their prowess. Clinical in their employment of the bomb and the torpedo, naval aviators had no need to resort to kamikaze tactics. And although Midway was a disaster from the standpoint that four of the IJN's fleet carriers were lost, aircrew losses were not yet crippling.

This changed during the fighting for Guadalcanal, which was a grinding six-month battle of attrition. There were two carrier clashes during the campaign, and the second one in October 1942 – the Battle of Santa Cruz – was a Pyrrhic victory, with Japanese aircrew losses worse than at Midway. Just as alarming, some 1100 naval aircraft were lost during the entire campaign, along with most of their highly trained crews. This was followed by a prolonged attempt during much of 1943 to slow the American advance up the Solomon Islands, this fighting featuring a constant series of aerial battles. The end result of this was the gutting of the IJNAF's cadre of highly trained aircrew.

The effect this had on fleet units was dramatically demonstrated in June 1944 in the largest carrier action of the war. In the Battle of the Philippine Sea, the IJN gathered a large force of nine carriers with 430 embarked aircraft. This carefully husbanded force was committed against the American invasion of the Mariana Islands. Retention of the Marianas was considered critical since it was within Japan's inner defence zone.

If these islands fell, the Americans would be in a position to mount long-range air attacks from airfields against the Japanese home islands. The carrier battle did turn out to be decisive, but not in the way the Japanese had hoped. Of the nine IJN carriers brought into the battle, three were sunk, and of the 430 aircraft available before the start of the campaign, only 35 remained at the end of the battle. Most disturbingly for the IJN, the greatest massing of carrier air power in the war resulted in a total of just three US Navy ships slightly damaged and none sunk. In this battle, 60 IJNAF aircraft made bombing attacks and scored only five hits or damaging near misses. None of these caused major damage.

The Battle of the Philippine Sea resulted in the virtual annihilation of the IJN's carrier force for the remainder of the war since there was no hope of training qualified air crew capable of taking on the US Navy's Fast Carrier Task Force.

To put it simply, conventional Japanese air attacks were increasingly ineffective. According to one detailed analysis, in the first six months of 1944, 315 Japanese aircraft survived fighter interception to attack various US Navy ships. Of these, just ten per cent scored a hit, and these most often caused only superficial damage. Of these 315 aircraft, 106 were shot down by AA fire. Against the US Navy's Fast Carrier Task Force, from November 1943 to June 1944, the results were less than five per cent of aircraft hitting a target in daylight attacks and just over two per cent for night attacks. In daylight, 195 aircraft made attacks and 40 per cent were destroyed by anti-aircraft fire.

With this backdrop, the examination of possible suicide tactics began to get traction. Even before the debacle during the Battle of the Philippine Sea there had been discussions in 1943 among the IJN's leadership about adopting suicide tactics. By August 1944 it was widely accepted that only suicide operations could change the course of the war. The man who translated these thoughts into action was Vice Admiral Takijiro Onishi.

On the surface, the kamikaze was a formidable weapon, and the formal adoption of this form of suicide attack was an extraordinary opportunity to turn the course of the war. The basis for its effectiveness was its sophisticated guidance system – a human pilot with the ability to instantaneously adjust to changing situations and guide his aircraft to the target. This pilot could theoretically select the most valuable ship for attack and then fly his aircraft into its most vulnerable part. Once at the target, the pilot was trained to release his bomb to cause additional damage before his aircraft became a multi-ton projectile with the added destructive power of any unused fuel still on board.

The kamikaze would make their debut towards the end of the series of engagements known collectively as the Battle for Leyte Gulf. These

On 21 February 1945 USS *Saratoga* (CV-3) was struck by three 'Jills' on the forward flightdeck during the Battle of Iwo Jima. Taking advantage of low cloud and *Saratoga*'s minimal three-destroyer escort, six B6N2s had scored five bomb hits on the carrier in just three minutes prior to three of the 'Jills' being flown into the vessel. The forward flightdeck of the veteran carrier was wrecked, its starboard side holed twice and large fires started in the hangar deck. Some 123 crewmen were subsequently listed as dead or missing, with a further 192 wounded. Thirty-six of *Saratoga*'s aircraft were also destroyed. The carrier being so badly damaged that it was put out of combat commission for the remainder of the war (*US Navy*)

had gone so disastrously wrong for the Japanese that it spelled the end of the IJN as an effective fighting force. Indeed, by the time the battle had come to its conclusion, the kamikaze constituted Japan's most viable option for responding to the invasion of Leyte and future American targets in the Philippines and beyond.

The exact number of suicide attackers sent against Allied ships from October 1944 until the end of the war is difficult to determine with certainty. An accepted source states that 3913 Japanese aircrew died conducting 3000 kamikaze missions. This included 2525 IJNAF and 1388 JAAF personnel. Of these 3000 missions, only one-third got to the point where they undertook an attack on a ship. If they got to this point, they had about a 36 per cent chance of success. Some 367 kamikazes hit their target or gained a near miss close enough to cause damage. In total, each kamikaze aircraft had about a 9.4 per cent chance of hitting a target, and if it did, it caused an average of 40 casualties.

Groundcrew from Kikusui-Tenzan Group (formerly 131st Kokutai) at Kanoya airfield, in Kagoshima, guide a Type 91 aerial torpedo beneath a B6N2 prior to the aeroplane flying a special attack mission in May 1945. The previous month, on 6 April, the Kikusui-Tenzan Group had participated in the first largescale kamikaze strike generated by the IJNAF and JAAF in response to the invasion of Okinawa (*Yasuo Tomishige/The Asahi Shimbun via Getty Images*)

The cost to the US Navy and its Allies was 66 ships or craft sunk or never repaired and almost 400 damaged in some measure. Of the ships or craft that never returned to service, only 39 were sunk outright. Coming up with exact figures for personnel casualties is difficult, but approximately 16,000 is generally accepted as accurate. This includes 6190 killed and 8760 wounded. According to official US Navy records, 'the enemy lost 784 suicide planes to score 216 hits on ships'.

Being rather slow, especially when armed with a torpedo, and not overly agile, the 'Kate' was not well suited to the role of kamikaze aircraft. Indeed, officially at least, the aeroplane's first dedicated special attack mission occurred as late as April 1945. However, B5Ns crews achieved some minor successes against US warships as early as December 1944, when they conducted impromptu suicide attacks on vessels supporting the amphibious landings on the island of Mindoro, in the Philippines. For example, on the 15th US landing craft shuttling troops to the shores of Mindoro came under attack by a formation of ten Zero-sens, 'Kates', Ki-44 'Tojos' and Ki-43 'Oscars'. Author Robin L Reilly described the action in his book *Kamikaze Attacks of World War II – A Complete History of Japanese Suicide Strikes on American Ships, by Aircraft and Other Means*;

The torpedo of this radar-equipped 'Jill' of Kikusui-Tenzan Group is in the final stages of being shackled to the aircraft. This complex and labour-intensive procedure is being closely watched by the crew of the aeroplane, who are wearing fur-lined flying helmets. (*Yasuo Tomishige/ The Asahi Shimbun via Getty Images*)

The special attack pilot of a Kikusui-Tenzan Group 'Jill' inscribes the message 'Hitchin' ('Determined to Sink', indicating' his determination to sink an enemy vessel) on his aircraft's tail prior to taking off on his final mission from Kanoya airfield in May 1945. The vertical inscription near the bottom of the rudder reads 'Yamamoto', probably indicating the pilot's name (*Yasuo Tomishige/The Asahi Shimbun via Getty Images*)

'At 0850 hrs, LST-605 had a close call as she shot down a "Zeke" that subsequently crashed into the water 20 ft off her port quarter after missing the ship by only five feet. As it exploded in the water, the force of the blast slightly injured men on the fantail. Shortly after 0900 hrs the ships opened fire on the planes and shot several down with their combined fire. In the midst of the air attack, two "Kates" were seen making a run on LST-738 from a low altitude. Fire from 738 and nearby USS *Moale* (DD-693) hit the planes but did not shoot them down. The first crashed into the LST, hitting it "amidships just above the waterline. Explosion and fire resulted – the plane was carrying bombs at the time. The second plane, which dove for LST-738's bridge and conn, missed and was shot down by DD-693 to the port of LST-738". Repair parties went to work fighting fires but were hampered by the damaged fire mains caused by the crash. Confusion reigned among the army troops and they were ordered by the commanding officer to abandon ship.'

At least 16 specially formed kamikaze units included varying numbers of 'Kates' within their ranks during the final months of the war, these suicide flights being parented by the Usa, Himeji and Hyakurihara Kokutai – all formerly B5N2 training units – and 12th Kokutai. One of the more successful flights was Hachiman-Goko 2, which sent out ten 'Kates' as part of Operation *Ten-Go*'s Kikusui No 2 on 12 April 1945. Six B5N2s from the Jobanchuka-tai also participated in this operation, which proved to be the second-largest mass kamikaze attack of the war – no fewer than 125 IJNAF and 60 JAAF aeroplanes targeted ships supporting the invasion of Okinawa. The battleships USS *Idaho* (BB-42) and USS *Tennessee* (BB-43) were both damaged in the attack, as was the destroyer USS *Zellars* (DD-777).

The latter ship had only recently been commissioned into the US Navy, and its combat service with the Pacific Fleet would last less than a month. *Zellars* was screening *Tennessee* when three 'Kates' (also reported as 'Jills') made a coordinated attack on the destroyer. They approached the ship from its port quarter at an altitude of about 15 ft above the water, *Zellars* accelerating to 25 knots and opening fire with all of its guns – six 5 in/38 dual purpose weapons and 12 40 mm and 11 20 mm AA guns. It shot down the lead attacker at a range of 1800 yards and hit the second torpedo-bombers at a distance of 3000 yards.

The destroyer then targeted the third kamikaze aircraft, scoring hits with its 40 mm cannon. The pilot, however, pressed home his attack and struck *Zellar*'s port side forward of the bridge in its No 2 handling room. His 500 kg bomb tore through several light bulkheads before exploding on the starboard side of the ship in the scullery. The vessel temporarily lost all power. Meanwhile, its aft 20 mm guns continued to fend off additional attacks, assisting in downing another aeroplane. That evening *Zellars* limped into Kerama Retto, southwest of Okinawa, with extensive damage. Temporarily patched up, the destroyer returned to the United States for repair several weeks later.

A B6N2 from Kikusui-Tenzan Group has its engine run up to full power prior to taking off from Kanoya airfield on a special attack mission in May 1945. B6N2s were claimed by defending US Navy fighters on 5 and 11 May as they protected the Okinawa invasion task force from kamikaze strikes (*Yasuo Tomishige/The Asahi Shimbun via Getty Images*)

Although the number of 'Kates' available for such attacks rapidly dwindled (only 1149 B5Ns had been built in total, compared with almost 10,500 Zero-sens – the IJNAF's staple kamikaze aircraft), they were still occasionally being shot down by US Navy fighters defending the Pacific Fleet from suicide attack right up to the end of the war. Indeed, on the very day Japan surrendered – 15 August 1945 – a solitary 'Kate' was one of the last five aerial victories of World War 2.

KAMIKAZE 'JILLS'

The B5N2's successor, the B6N2, proved to be more effective in the kamikaze role thanks to its increased speed. At least eight kokutai formed kamikaze units, the latter being christened the Kikusui-Tenzan Group (131st and 701st Kokutai), Kikusui-Ten-o Group (901st Kokutai), Kikusui-Rai-o Group (931st Kokutai), Mitate 2 Tenzan (601st Kokutai), Mitate 3 Tenzan (210th Kokutai), Hachiman Group (761st Kokutai) and Kiichi Group (763rd Kokutai). Early 'Jill' kamikaze actions were also described in detail by Robin L Reilly;

'USS *Reid* (DD-369) was part of Task Unit 78.3.8 charged with escorting ten LSMs and three LCI(L)s to Ormoc Bay to resupply American forces there on 11 December 1944. Flying overhead was a CAP of four Corsairs. At 1500 hrs, snoopers began to appear on the radar screens, but turned away out of gun range. Around 1700 hrs, 12 bogeys approached the convoy from dead ahead. They were tentatively identified as "Jills" and the ships went on alert. As *Reid* was in the leading edge of the convoy, she took the Japanese planes under fire at 10,000 yards and turned to starboard to bring her guns to bear.

'Two of the Corsairs got behind the "Jills" and began to attack them as the ships fired on the enemy planes. *Reid* shot down three enemy aircraft before one hooked its wing in the starboard whaleboat, pivoted over and crashed close aboard the starboard bow. The plane that delivered the *coup de grace* came in from astern, crashed the No 3 gun and slid forward to the port side 40 mm gun tub, where it came to rest in a flaming ball of fire. Its bomb penetrated the hull and blew up in the after magazine room, effectively ripping apart the entire stern section. In the space of about 15 seconds *Reid* had suffered two hits and five close crashes. Her depth charges went off, injuring and killing some of the men in the water. Others fell victim to Japanese planes, which strafed them until they were driven off by Corsairs. *Reid* lost 103 men in the attack.'

Although suicide attacks such as this one were now the order of the day, B6N2 units still occasionally flew torpedo-bombing missions at dawn and dusk in search of Allied shipping. Supply convoys, consisting primarily of lightly armed, and armoured, Liberty ships proved to be tempting targets, and they were routinely attacked during daylight

A B6N2 from Kikusui-Tenzan Group departs Kanoya on a special attack mission in May 1945. Kanoya served as the focal point of the IJNAF's kamikaze efforts, and was the primary airfield from which the IJN launched such strikes. The 'Jill' had officially carried out its first special attack missions in early January 1945 (*Yasuo Tomishige/The Asahi Shimbun via Getty Images*)

A captured B6N2 undergoes flight testing and evaluation by the US Technical Air Intelligence Unit-SWPA in June 1945, the aeroplane being flown from Clark Field near Manila, in the Philippines. The flight-test team found that although the aircraft had impressive speed for a torpedo-bomber, it still suffered from the same weaknesses and shortcomings as its predecessor, the B5N. Two more 'Jills' were shipped back to the USA on board USS *Barnes* (CVE-20) in November 1945, although neither of these were restored to airworthiness. One survived to be handed over to the National Air and Space Museum, and it has been in storage with the collection for more than 30 years (*US National Archives at College Park, MD, Still Pictures Branch*)

hours by both kamikaze aircraft and dive- and torpedo-bombers conducting conventional attacks.

One such convoy of 15 merchant ships carrying supplies and troops to Leyte came under attack northeast of Mindanao on 5 December 1944. A 'Jill' made a run on the Liberty ship SS *Antoine Saugrain* from the port beam, its torpedo striking the freighter in the stern and the subsequent explosion knocking off its rudder. Fifteen minutes later another B6N2 put a torpedo in the ship's No 2 hold. *Antoine Saugrain* had nearly 450 Army troops and crew on board, and they were all transferred to the SS *Coronado* and SS *San Pedro*. Torpedo attacks were also made on other ships in the convoy, but none were hit. Two vessels suffered damage from bombs and kamikaze attacks, however. *Antoine Saugrain* was taken under tow, and the ship eventually sank on 6 December.

Although clearly still capable of targeting ships with torpedoes, B6N2 units resorted more and more to kamikaze strikes in the final months of the war – the 'Jill' had officially carried out its first such special attack mission in early January 1945. The B6N achieved its greatest success in this role on 21 February 1945 during the Battle of Iwo Jima, when Mitate 2 Tenzan targeted *Saratoga*. Taking advantage of low cloud cover and the carrier's weak destroyer screen (just three vessels), six 'Jills' scored five bomb hits on the carrier in three minutes – three of the aircraft also struck the carrier. *Saratoga*'s flightdeck forward was wrecked, its starboard side was holed twice and large fires broke out in the hangar deck. A total of 123 sailors were killed or listed as missing and 192 wounded. Some 36 aircraft were also destroyed. The carrier was so badly damaged that it was placed out of combat commission for the remainder of the war.

Later that same day, just prior to sunset, the mine and net-laying ship USS *Keokuk* (CMc-6) was hit by a solitary 'Jill' while sailing in formation with a group of LSTs off Iwo Jima. The B6N2 dived out of cloud cover and hit the ship on the starboard side, knocking out most of its starboard 20 mm gun battery. The fires caused by the kamikaze were soon extinguished, the ship having had 17 sailors killed and 44 wounded in the action.

'Jills' were also frequently encountered in the skies over Okinawa as the IJNAF and JAAF desperately attempted to repel the invasion of the island from 1 April. Although not seen in the same numbers as 'Vals' and Zero-sens, it appears that B6N2s possibly sunk as many as three US Navy destroyers (including USS *Bush* (DD-529), which was hit by three aircraft on 6 April) and badly damaged the carrier USS *Intrepid* (CV-11) on 16 April. As with the 'Kate', small numbers of 'Jills' continued to be shot down by US fighters flying CAP missions for the Pacific Fleet through to the very last days of World War 2, with the final two being claimed on the afternoon of 13 August.

APPENDICES

COLOUR PLATES

1

B5N1 'Ri 312' of Hyakurihara Kokutai, Hyakurihara, Japan, early 1939

The IJNAF's Hyakurihara Kokutai was responsible for the training of naval aviators destined to fly the B5N1 in combat over China during the Second Sino-Japanese War. Looking resplendent in its overall silver paint finish, the aeroplane also has a black anti-glare panel that covers the entire engine cowling, with a curved demarcation line to the front of the windscreen – this was seen on most B5Ns until the advent of dark green uppersurface camouflage. The red tail assembly was a standard marking for all IJNAF aircraft, except primary trainers, from June 1933 as a visual aid for the location of downed machines.

2

B5N1 '9-391' of 14th Kokutai, Haihow, China, 1939

B5N1s commenced combat operations over China from shore bases and the flightdecks of the IJN's growing carrier fleet in the autumn of 1938, and they remained in action through to the summer of 1941. This camouflaged example was one of a handful of B5N1s issued to 14th Kokutai that flew an airfield in the port city of Haihow in 1939. 12th Kokutai was the other land-based unit to see action with the aeroplane in China. Both units had mixed fleets of aircraft, which were assigned to the fighter, bomber or attack daitai depending on their role – B5N1s flew alongside Yokosuka B3Y1 biplane torpedo/attack aircraft with the attack daitai. This aeroplane is armed with an 800 kg bomb.

3

B5N2 'VI-324' aboard *Kaga*, Japan, spring 1941

B5N2s started to reach the aviation squadrons assigned to *Kaga* and *Akagi* of 1st Koku Sentai and *Hiryu* and *Soryu* of 2nd Koku Sentai in late 1940, these aircraft flying from a variety of airfields throughout southern Kyushu when not embarked in their respective carriers. Aside from its standard pre-war IJNAF markings, 'VI-324' also displays a single rear fuselage stripe, indicating its carrier assignment within the koku sentai.

4

B5N2 '301' of Cdr Mitsuo Fuchida aboard *Akagi*, Central Pacific, December 1941

This was the aeroplane from which Cdr Mitsuo Fuchida lead the first attack wave of IJNAF aircraft against US military forces on the island of Oahu during the surprise attack on Pearl Harbor on 7 December 1941. During the attack '301' scored a direct hit on the battleship *Maryland* with its 800 kg No 80 armour-piercing bomb. According to an interview given by Fuchida in 1972, his B5N2 was camouflaged by brush en route to the 'Hawaiian Operation in the available greens and browns'. However, it would appear that the 'Kate' was painted in dark green only. The striped tail surfaces had originally been applied when Mobile Force was conducting exercises in the lead up to the Pearl Harbor mission, and Fuchida decided to retain the scheme for the actual operation.

5

B5N2 'AI-311' of Lt Cdr Shigeharu Murata aboard *Akagi*, Central Pacific, December 1941

This aeroplane was assigned to Lt Cdr Shigeharu Murata, who was acknowledged by his peers to be the best torpedo-bomber pilot in the IJNAF at the time of the Pearl Harbor raid. Leading 40 torpedo-armed 'Kates' during the attack on Battleship Row, Murata hit the battleship *West Virginia* with his weapon at 0757 hrs on 7 December 1941. A further eight torpedoes would strike their targets shortly thereafter. Murata's aeroplane had two horizontal command stripes on its tail.

6

B5N2 'EI-311' aboard *Shokaku*, Central Pacific, December 1941

This aircraft was one of 18 B5N2s from *Shokaku* that devastated Naval Air Station (NAS) Kaneohe from 0855 hrs, these aeroplanes being part of the second wave attack. 'EI-311' is armed with a combination of 60 kg Type 2 No 6 Model 5 and 250 kg Type 1 Model 25 Mark 2 bombs. Led by Lt Tatsuo Ichihara, the 'Kates' – and strafing Zero-sens from three carriers – inflicted considerable damage on the airfield, destroying 33 PBYs and one OS2U Kingfisher.

7

B5N2 'BI-312' aboard *Soryu*, Central Pacific, December 1941

'Kates' embarked in *Soryu* and *Hiryu* featured unusual brown and green camouflage, as seen on 'BI-312'. Sixteen aircraft from these carriers had been tasked with targeting 1010 Dock and key ships on the northwest side of Ford Island. Led by Lt Hirata Matsumura, they had split off from the 'Kates' heading for Battleship Row in search of the carriers usually berthed here, but found only cruisers, the training battleship *Utah* and minelayer *Oglala*.

8

B5N2 'EII-301' of Lt Cdr Shigekazi Shimazaki aboard *Zuikaku*, Central Pacific, December 1941

Lt Cdr Shigekazi Shimazaki led no fewer than 27 'Kates' from *Zuikaku*, escorted by nine Zero-sens from *Akagi*, in the attack on

Hickam Field that commenced at 0905 hrs. They targeted hangars and barracks blocks, causing widespread damage and considerable loss of life. Shimazaki's 'Kate' was marked with horizontal command stripes on the tail and vertical ship identification stripes around the rear fuselage.

9

B5N2 'BI-310' of Lt Joichi Tomonaga aboard *Hiryu*, Central Pacific, June 1942

Lt Joichi Tomonaga led two strikes on 4 June 1942 during the Battle of Midway – the first against the atoll's two islands in the morning and then an ill-fated attack on the carrier *Yorktown* in the afternoon. Bearing command stripes on the tail, 'BI-310' had its right main wing tank punctured when Tomonaga's force was bounced by US Marine Corps F2A-3s from VMF-221 during the strike on Midway. Upon his return to *Hiryu*, Tomonaga refused to switch aircraft for the attack on *Yorktown* despite knowing he had insufficient fuel in 'BI-310' to make it back to the carrier after he had dropped his torpedo. The aeroplane was subsequently shot down by ace Lt Cdr 'Jimmy' Thach, commanding officer of F4F-equipped VF-3, as Tomonaga made his run in on *Yorktown*. Although the latter got his torpedo away before crashing to his death, the weapon missed its intended target.

10

B5N2 'EII-307' aboard *Zuikaku*, Southeast Pacific, October 1942

This aeroplane was one of 17 'Kates' despatched by *Zuikaku* to attack the carrier *Enterprise* on 26 October 1942 during the Battle of Santa Cruz, the strike being led by Lt Shigeichiro Imajuku. Lacking fighter escorts, the B5N2s were badly mauled by defending Wildcat fighter CAPs, and only nine managed to launch their torpedoes. None of these hit the wildly manoeuvring *Enterprise*, however. No fewer than 30 'Kates' of the 57 fielded by the IJNAF at the start of the Battle of Santa Cruz were lost.

11

B5N2 'KEB 312' of 931st Kokutai aboard *Kaiyo*, South China Sea, April 1944

One of twelve 'Kates' embarked in the IJN escort carrier *Kaiyo* on 29 March 1944, this aircraft flew anti-shipping and ASW missions for convoy HI-57, consisting of nine vessels (including four large oilers and two troop transports) – the latter were bound for Singapore. Torpedo wakes were seen on 5 April, and 'Kates' supported two escort vessels in a depth charge attack. Ten days later a B5N2 dropped 250 kg bombs on a submarine in the South China Sea, and on 24 April two more were expended in an attack on USS *Robalo* (SS-273), spotted on the surface 15 miles behind the convoy. The second bomb exploded close to port when the submarine had only reached a submerged depth of 55 ft, causing considerable, but not fatal, damage. By then the carrier was on its way back to Japan with convoy HI-58. 'Kates' from 931st Kokutai (of General Escort Command) embarked in *Kaiyo* escorted a number of other convoys sailing to Singapore and Manila into early 1945, engaging several submarines during this period.

12

B5N2 '303' of 3rd Okazaki Kokutai, Okinawa, April 1945

Equipped with air-to-surface radar, this aircraft primarily flew ASW missions from Okinawa in the months prior to Operation *Iceberg* – the invasion of the island, which commenced on 1 April 1945. This specialised role almost certainly spared the 'Kate' from being used in a kamikaze attack against Allied vessels supporting the amphibious landings of the island. The 3rd Okazaki Kokutai, to which this aeroplane was assigned, served as a training unit following its formation from the Nagoya Kokutai in February 1945. A large number of novice pilots who had completed the Hiko Yokaren (preparatory flight training) course with the one of the three Okazaki air groups subsequently gave their lives in the attempt to defend Okinawa. The wreckage of this aircraft was discovered on the island by US troops in June 1945.

13

B5N2 'KEB-306' of 931st Kokutai, Saipan, June 1944

This aircraft from 931st Kokutai was captured on Saipan's Ås Lito airfield following the seizure of the island in July 1944 after more than three weeks of bloody fighting. Built in December 1943 and equipped with air-to-surface vessel radar, it was shipped back to San Diego, California, aboard USS *Copahee* (CVE-12) along with 13 Zero-sens and 37 Japanese aero engines. Overhauled, the B5N2 flew for the first time in American hands on 16 November 1944. Early test flights evaluated the performance of the radar equipment during sorties against vessels sailing off the Delaware coast, the equipment being operated by an experienced radar technician from the Naval Radio Laboratory.

14

B5N2 '302' of 105th Naval Base Unit, Vanukanau, Rabaul, October 1945

This 'Kate' was the last flyable example of the B5N2 left at Rabaul by war's end. Assigned to 105th Naval Base Unit, the aeroplane was escorted by four Royal New Zealand Air Force F4U-1 Corsair fighters on 14 October 1945 from Rabaul to Jacquinot Bay, in New Britain, where its pilot, WO Goro Kataoka, surrendered. The aircraft was abandoned here, and it was forgotten about until recovered by a warbird collector and shipped to Australia in 2006. Ten years later, a wing and a portion of the fuselage from '302' were publicly unveiled at the Pacific Aviation Museum in Honolulu, Hawaii. It is believed that the aeroplane was involved in a night attack on two floating drydocks – misidentified as carriers by an IJNAF reconnaissance aircraft – in Seeadler harbour (a major US Navy base

in the Admiralty Islands) on 27 April 1945. Two 'Kates' attacked separate targets from 2315 hrs, '302' being flown by Ens Tokuya Takahashi, with Ens Chuhei Okubo (who had been involved in the attack on Pearl Harbor, flying in a B5N2 from *Shokaku* that had bombed NAS Kaneohe) navigating and CPO Shigeo Terao manning the radio and rear gun. The crew successfully attacked ABSD-2 floating drydock, damaging it with their torpedo. Takahashi landed back at Vunakanau at 0200 hrs, having been aloft almost six hours. The second 'Kate' failed to return from the mission, however.

15

B6N1 '1$_2$-383' of 1st Koku Sentai, aboard *Zuikaku*, spring 1944

This early 'Jill' was supplied to 1st Koku Sentai when it began to rebuild following the disastrous Operation *Ro-go* campaign. New torpedo-bomber crews flew myriad training missions in early-build B6N1s like this machine in preparation for fleet operations during the summer and autumn of 1944.

16

B6N1 '3$_1$-366' of 653rd Kokutai aboard *Chitose*, Inland Sea, Japan, April 1944

This aircraft was used for training flights to help familiarise IJNAF 'Jill' aircrew with operating from a carrier – in this case the light carrier *Chitose*, a converted seaplane tender. 653rd Kokutai had been created as part of the IJNAF restructuring on 15 February 1944, the unit embarking aircraft in *Chiyoda*, *Zuiho, Zuikaku* and *Chitose*. The latter vessel departed the Inland Sea and headed east to join Mobile Fleet on 11 May after landing aeroplanes from 653rd Kokutai on board, the carrier participating in the ill-fated defence of Saipan and the Marianas on 19-20 June.

17

B6N2 '313-389' of 601st Kokutai aboard *Shokaku*, Tawi-Tawi, the Philippines, May 1944

The *Shokaku* Air Group became 601st Kokutai as part of the IJNAF restructuring on 15 February 1944, this designation change also affecting air groups embarked in the carriers *Taiho*, *Zuikaku*, *Unryu* and *Amagi* (all part of the First Carrier Division). At this time 601st Kokutai embarked Zero-sens, 'Jills', 'Vals' and 'Judys' in *Shokaku*, which was subsequently sunk on 19 June 1944 by the submarine *Cavalla* during the First Battle of the Philippine Sea. Nine aircraft went down with the ship, including two 'Jills'.

18

B6N1 '1$_2$-382' of 601st Kokutai, Singapore, spring 1944

The IJNAF retained a substantial force of aircraft and ships in Singapore throughout World War 2. Aeroplanes from First Mobile Fleet carriers would spend varying amounts of time flying from airfields on the island while vessels were overhauled in Seletar naval yard. This early 'Jill' was one of just 133 B6N1s built by Nakajima before production switched to the re-engined B6N2. It is highly likely that this aeroplane was destroyed during the First Battle of the Philippine Sea, when the IJNAF lost more than 600 carrier- and land-based aircraft during the 'Great Marianas Turkey Shoot'.

19

B6N2 '52-33' of 752nd Kokutai, Toyohashi airfield, Japan, spring 1944

This 'Jill' served with 752nd Kokutai, which was charged with training B6N aircrew destined for frontline operations. Towards the end of the war, numerous IJNAF aircraft flying in Japan had their individual identification numbers also applied in white chalk to their national markings, as seen here.

20

B6N2 '311-312' of 601st Kokutai aboard *Taiho*, First Battle of the Philippine Sea, 19 June 1944

As previously noted, 601st Kokutai suffered grievous losses during the First Battle of the Philippine Sea whilst trying to attack the US carriers of TF 58. This aircraft was embarked in the new carrier *Taiho,* having sailed with the vessel after it had completed shakedown training in the Inland Sea in March 1944. Having taken off just before *Taiho* was fatally struck by a single torpedo fired by the submarine *Albacore* on the morning of 19 June, this aeroplane was one of 79 'Jills' launched against TF 58 in three waves. None of the B6N2s succeeded in penetrating the Hellcat CAP or the intense AA screen thrown by the American warships.

21

B6N2 '322-24' of 652nd Kokutai aboard *Hiyo*, First Battle of the Philippine Sea, 19 June 1944

652nd Kokutai was also created as part of the IJNAF restructuring on 15 February 1944, the unit supplying aircraft for *Junyo, Hiyo* and *Ryuho* of the Second Carrier Division. The latter went into the First Battle of the Philippine Sea badly understrength, with '322-24' being one of just 15 'Jills' split between the three carriers. Seven of these aeroplanes were committed to the Second Carrier Division's first strike on 19 June (First Mobile Force's third attack of the day), but no hits were registered. All of the 'Jills' were lost in this attack, as was *Hiyo* the following day.

22

B6N2 '333-45' of 653rd Kokutai aboard *Zuiho*, First Battle of the Philippine Sea, 19 June 1944

This aircraft also attempted to make a torpedo attack on TF 58 on 19 June 1944, '333-45' flying from ***Zuiho***, which was in turn part of 'Van Force' that also comprised ***Chitose*** and ***Chiyoda***. The trio of carriers (which had 27 B5N2s and B6N2s embarked between them) was screened by a powerful force of four battleships and fourteen cruisers.

23

B6N2 '653-22' of 653rd Kokutai aboard *Chiyoda*, Battle of Leyte Gulf, 25 October 1944

Chiyoda was part of Vice Admiral Jisaburo Ozawa's Decoy Force during the Battle of Leyte Gulf, his four carriers embarking just 116 aircraft between them – including 25 B6N2s and four B5N2s. '653-22' was lost either when *Chiyoda* sent out a modest strike force on the morning of 24 October (14 'Jills' or 'Kates' were lost to enemy action that day) or when the carrier was sunk by US Navy dive- and torpedo-bombers the following day.

24

B6N2 '51-312' of 551st Kokutai, Truk Atoll, Caroline Islands, June 1944

As many as 40 B6N2s were flown to the Marianas from Peleliu in early June 1944 in preparation for the First Battle of the Philippine Sea, these aeroplanes being assigned to 551st Kokutai. Although they would enjoy little success during the battle itself, five 'Jills' from Truk were credited with the destruction of the 400-ton troop-carrying Landing Craft Infantry amphibious assault ship LCI(G)-468 during a dusk attack on 17 June. Three of the B6N2s fell to AA fire during the engagement, the two surviving crews claiming that they had sunk a light cruiser rather than a humble landing craft. The previous day, according to IJNAF records, no fewer than 11 'Jills' had also sunk a cruiser and four transports – the US Navy recorded no such losses, however.

25

B6N2 '330' of 903rd Kokutai, Yokosuka, Japan, spring 1945

903rd Kokutai was created on 15 December 1944 as one of three large ASW patrol units to protect Japanese territories from a growing submarine threat. 903rd's area of responsibility was mainland Japan and the areas of Asia in which the IJN operated. It was equipped with a variety of aeroplanes to perform this role, including a handful of 'Jills'. The ASW mission was all but abandoned following the invasion of Okinawa, however, 903rd being called on to form a special attack unit in April 1945. '330' was one of only two standard 'Jills' that were expended in kamikaze attacks by the unit.

26

B6N2 '348' of Genzan Kokutai, Gannosu airfield, Fukuoka, Japan, summer 1945

Assigned to the special attack flight of Genzan Kokutai during the defence of Okinawa, '348' inexplicably survived the war – probably due to serviceability issues – and was discovered in a sorry state at Gannosu airfield, in Fukuoka prefecture, by occupying US forces in September 1945. B6Ns were known to have flown ASW missions along the northwestern coast of Japan from Gannosu, and this aeroplane may have participated in such flights also.

27

B6N2 '306' of Himeji Kokutai, Kushira airfield, Kagoshima, Japan, April 1945

Like the B5N2, a small number of B6N2s were fitted with air-to-surface radar for ASW and anti-shipping missions – the distinctive fuselage- and wing-mounted aerials associated with this equipment are clearly visible on this aeroplane. Flying from Kushira airfield, on the southern tip of Kagoshima prefecture, radar-equipped B6N2s of Himeji Kokutai flew myriad ASW missions off southwestern Japan in 1944-45. In the wake of Operation *Iceberg*, aircraft such as '306' became makeshift trainers for would-be kamikaze crews who were given just enough instruction on the B6N to enable them to fly standard 'Jills' on one-way missions against Allied ships sailing off Okinawa.

28

B6N2 '331' of 903rd Kokutai, Ominato airfield, Honshu, Japan, April 1945

Based at Ominato airfield, which was in turn part of a major IJN facility in northern Honshu, 903rd Kokutai targeted Allied warships operating off Japan's east coast during the final months of the conflict in the Pacific. Missions were flown singularly or in pairs, with 'Jill' crews attempting to target lone vessels at dawn or dusk. Despite their best efforts, the B6N2s achieved very little in the way of success, and lost a handful of aeroplanes to patrolling US Navy CAPs in return.

29

B6N2 '131-56' of Kikusui-Tenzan Group (formerly 131st Kokutai), Kushira airfield, Kagoshima, Japan, 6 April 1945

This aircraft, assigned to the special attack Kikusui-Tenzan Group, participated in the first largescale kamikaze strike generated by the IJNAF and JAAF in response to the invasion of Okinawa. Codenamed Kikusui Operation No 1, it involved 230 IJNAF aeroplanes and 130 from the JAAF, supported by more than 130 fighters and IJNAF dive-bombers. USS *Bush* (DD-529) was operating as a radar picket ship off Okinawa on the afternoon of 6 April 1945 when it was targeted by kamikaze aircraft. Although the destroyer's gunners managed to down one aeroplane, three bomb-equipped B6Ns eventually struck the vessel and it broke in half and sank.

30

B6N2 '131-64' of Kikusui-Tenzan Group (formerly 131st Kokutai), Kanoya airfield, Kagoshima, Japan, May 1945

The B6N2 proved to be more effective in the kamikaze role than the B5N2 thanks to its increased speed, even when laden down with an 838 kg Type 91 torpedo. At least eight kokutai formed kamikaze units, most of which flew from airfields in Kagoshima prefecture due to its close proximity to the Ryukyu Islands and, specifically, Okinawa.

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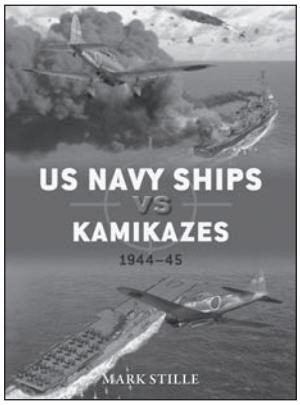

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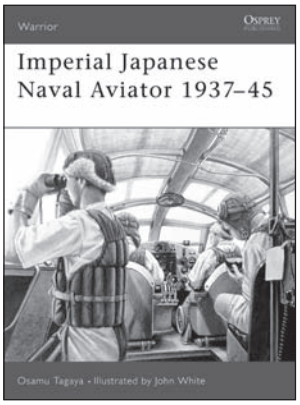

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